

## Expert Spotlight: Seshumani Vorrey

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While women cyclists in India were stigmatized until the last decade, BPUB Regulatory Compliance Specialist Seshumani Vorrey recalls the fact that her father teaching her to ride a bicycle gave her the freedom not just to travel to attend science events and exhibitions but also opened her world to the possibilities of being a scientist.

According to Vorrey, such parental support led to her advancing at school and in her career as a research scientist. Since her first place first grade science fair project, she recalls moments in her early life that her love of science really made a lasting impression.

“In seventh grade, we had a school science fair,” she said. “Going out to check the mollusks that were placed at the mouth of the water bodies to check the quality of water discharged into the water bodies. When we release treated water into the lakes and rivers my first thought that came to mind was, ‘Water sustains life.’ I realized in that moment that I have an opportunity to help sustain our precious water supplies.”

Although science was always her favorite subject, it was not her only focus. A popular student, Vorrey was elected by her peers as the head girl (a position of school leader, ambassador and role model) of Saint Ann's High School, a girl's school located at East Marredpally, Secunderabad, India. She led all class prefects and was in charge of organizing everything from elocution, dances to debates.

After graduating from Saint Anne's High School, Vorrey earned her bachelor's degrees in chemistry at Arts and Science College at Warangal, India, and masters in organic chemistry at Osmania University in Hyderabad, India. Later, she earned a dual master's degrees in physical chemistry (nanotechnology) from the University of Tulsa, Okla. with a thesis. Her thesis is titled “Ionic Conduction of Solid Polymer Electrolytes Confined in Micro and Nanopores.” Vorrey says if she were not working at the BPUB, she would be working on the thermodynamics of polymers confined in the Micro and Nanopores. By definition, a nanopore is a pore of nanometer size. The pores are created by a process called etching in synthetic material or naturally present in a pore-forming protein.

Vorrey also worked as a research assistant in the chemistry and biochemistry departments at the University of Tulsa and Organic and Biochemical Research at the University of Tromsø, Norway prior to her employment at the BPUB.

A globally published researcher, Vorrey's most cited article is “Vorrey, S. and Teeters, D., “Study of the Ion Conduction of Polymer Electrolytes Confined in Micro and Nanopores,” *Electrochimica Acta*, 48, 2137 (2003). Her work has also been the basis of a U.S. patent for nanoscale three-dimensional battery architecture.

In her work as a research and development chemist, Vorrey says that she once again began to contemplate the basic protection of water.

“It’s totally different from research and development. It’s a nice feeling as you’re part of providing something to the community, an important commodity for day-to-day life, clean water,” she said. “It would be nice if the public would get to know more about the treatment of water and wastewater and understood what it takes to provide clean and safe drinking water.”

Vorrey says the most challenging aspect of water and wastewater analyses are variables that present challenges to water treatment.

“There are numerous possibilities for things to go wrong with water,” she says. “Anything weather related, source related (like the river or upstream contamination) or operational factors, and yet the standard is providing safe drinking water to the public.”

The researcher says that better automation and advanced technology (like using drones to pull water samples) may be able to best protect drinking water quality, safeguard water resources and ensure the sustainability of the water supplies that are crucial to public health and the environment.

When she is not working in the laboratory, she is working in her patio vegetable and herb container garden. She also spends her free time with family and friends, reading, meditating or doing yoga. Owing to her adventurous spirit, she likes to travel and explore different cultures to practice her vocabulary that includes six languages.

“It would surprise most people to know that I speak Norwegian ‘Jeg snakke Norsk’ (I speak Norwegian.) Or that I did research on steadying metabolic pathways at the University of Tromsø in Norway. The idea was to design a drug to cure hangovers.”