

Dr. Vicky Karanikola



Dr. Vicky Karanikola (@vkaranikola on Twitter)

Photo caption: Headshot of Dr. Vicky Karanikola.

Photo credit: KORES Lab

Dr. Vicky Karanikola (she/her) joined the Department of Chemical and Environmental Engineering at the University of Arizona (UA) as an Assistant Professor in Fall 2019. Her current research focuses on the design and optimization of water and wastewater treatment processes. Indigenous communities can often find it difficult to access affordable clean water, as local groundwater sources can be contaminated with salts, bacteria or heavy metals. Dr. Karanikola engages in techno-economic and energetic analysis of water treatment processes to help communities find a balance between health risk and cost. She was recruited to the Indige FEWSS team because of her research focus, as well as her doctoral work with the Navajo Nation that started in 2011. In addition to continuing to work on the Navajo Nation through Indige FEWSS and the KORES Lab, she has been working with Engineers Without Borders as a volunteer since 2007 in sanitation, water access and irrigation projects with the University of Arizona Chapter that had projects in Bolivia, Ghana, Mali, and the Dominican Republic and continues to work on projects within the San Carlos Apache Nation.



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Dr. Karanikola has worked with communities in Bolivia, Ghana, Mali, the Dominican Republic, the San Carlos Apache Nation, and the Navajo Nation.

Photo caption: Map of Dr. Karanikola's outreach.

Photo credit: Scribble Maps

Dr. Karanikola's research addresses food, energy, and water security issues through the design of water treatment processes to provide safe drinking water in the Navajo Nation. The KORES lab brings innovation to existing nanofiltration technology by incorporating solar, and optimizing cost and energy consumption of these processes to make their adoption affordable and accessible. A major success of this work was providing an affordable solution to potable water. While the average cost of hauling water on the Navajo Nation was \$15 per 100 gallons (NNDWR, 2011), current solar powered nanofiltration system designs can now purify onsite water at a cost between \$0.80-\$1.00 per 100 gallons.



Photo caption: Making water from the sun with the Navajo Nation Pilot Scale Solar Nanofiltration system.

Photo credit: KORES Lab

Dr. Karanikola notes that a common challenge when addressing these issues is to implement solutions that do not add to the daily demands on individuals. In her work with Engineers without Borders (EWB), she has observed that the most successful projects are initiated and supported by the communities themselves, with outside engineers providing technical resources and problem resolutions. She reminds us that community members have the best understanding of what their community truly needs, and therefore know the best ways to implement lasting solutions to the problems their communities face. Dr. Karanikola sees promise in community involvement in water filtration projects that develop business opportunities for community members. This investment leads to revitalization and career development opportunities, which are of limited access in Indigenous communities. Her research works to lessen the costs of filtering and accessing clean water to enable economic and health benefits to communities. Dr. Karanikola says her work with EWB prepared her for her involvement with Indige-FEWSS, and that it was a “no brainer” to accept the invitation extended to

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her to join the team.

Going forward, Dr. Karanikola's research goals are to continue to improve the efficiency of the solar nanofiltration systems as they are deployed beyond the demonstration scale.

This profile was prepared by Indige-FEWSS trainees Amy Pierce, Frances Willberg, and Adrianna Nicolay in Fall 2020.

References

Navajo Nation Department of Water Resources (NNDWR). 2011. *Water Resource Development Strategy for the Navajo Nation*.