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## Featured Researcher | Chinyere Mbachu

(<http://www.tntech.edu/files/pressreleases/2011/ChiChi.JPG>) **TTU chemical engineering doctoral student works to remove organic contaminants to ensure safe drinking water**

### Research summary:

By working on ways to remove harmful organic compounds from water, Chinyere "ChiChi" Mbachu, of Nigeria, is trying to ensure safe drinking water for developing nations and protect aquatic ecosystems.

### Advisers:

Pedro Arce, chemical engineering chairperson

J. Robby Sanders, chemical engineering professor

### Environmental research group members:

Cynthia Torres, Ph.D. student, environmental science and chemistry

Tyler Cosby, junior, chemical engineering

Kristina Jevtic Jegdic, senior, chemical engineering

### Center of Excellence affiliation:

Center for the Management, Utilization and Protection of Water Resources

### Research procedure, findings:

Mbachu runs deionized water with various organic contaminants through a pulsed-corona discharge reactor. After a certain amount of time, they take the samples for analysis at the Water Center to see if the contaminants have been degraded enough to make the water fit to drink. That way, they can find out how long it takes to remove harmful organic molecules through dissolved organic carbon content, like those found in oil and petroleum, to make drinking water safe and protect natural ecosystems.

### Research application:

"My research is about degradation of organic contaminants in drinking water or aqueous solutions like fruit juices," she said. "Sometimes you have all these organic molecules in water and when you drink them they can cause health problems such as liver or kidney failure so this research can help degrade the contaminants in water and improve the lives of people."

### Publications:

Four of her manuscripts are under review for publication with professional journals.

### What motivates you to do this research?

"I am working on this research because of the environmental problems caused by oil spillage in Nigeria, my home country. In Nigeria, we have a lot of environmental problems such as water pollution and gas flaring that affects most of the people who live in the Niger delta. Nigeria's oil production is the tenth biggest in the world and lots of companies dump their waste in the water and make life impossible for most residents who live with little or no access to good drinking water," Mbachu said.

"This causes a lot of problems like health problems, reproductive problems, especially for the women who depend on the water for daily use and agriculture. Oil spillages, land degradation, water pollution and gas flaring pose great challenges and have resulted in abject poverty and poor health. So after thinking on it, I decided to come and study and focus my



research in this area.”

**What are your future plans in this research area?**

“My future research plan is to work on this and go to my home country university because I want to be a faculty or a researcher in the area of energy and the environment. I am exploring how to best establish a research center so I can help train students, especially young women, in engineering. I want to be a role model for young women so they can understand the results of all these pollutants they are ingesting and all the environmental issues and they can help ensure environmental sustainability.”

**What have been the biggest challenges you’ve faced in this area?**

“Some of the difficulties I’ve had is funding and infrastructure. If we could make the equipment in a larger scale that can work faster; it would be awesome. Sometimes this still takes a long period of time and you have to spend many hours here. The professors here, especially my adviser, are awesome but if we don’t have the facilities needed, the research is always slow. Coming from another background and doing chemical engineering was a big challenge but I was able to make great progress and now I’m working on my Ph.D.”

**What is your dream research project?**

“My dream research project is to still work on environmental issues. Energy and water these are some of humanity’s biggest challenges facing us, especially in developing countries.”

*Last edited 2014.08.15 by unknown.*