NANO TECH, BIG IMPACT

They're a million times smaller than a hair follicle on your head.

But they can be used to solve some of our biggest problems. Dr. Sherine Obare has spent her career studying nanomaterials – natural and manmade substances that can be measured in nanometers – and their real-world applications.

The new dean of the Joint School of Nanoscience and Nanoengineering leads a research team that explores how nanomaterials can be used to address some of society's most pressing issues: antibiotic resistance, food safety, and environmental pollution, to name a few.

Over the last decade, Obare has secured more than $5 million in federal grants to advance the emerging field of nanotechnology.

"Nanotech has the ability to change the way we address different types of problems because it brings an integrated approach," Obare explains. "When you're making a nanomaterial, you start with the fundamentals of chemistry. When you're trying to understand how a nanomaterial behaves, physics comes into play. We use these materials to address health and environmental challenges."

In one project, Obare is applying this integration of the sciences to search for innovative solutions to antibiotic resistance.

A common approach to combating antibiotic resistance is to create new drugs. However, it takes approximately 10 years for a drug to go through the development and FDA approval process. When it's a matter of life or death, that's too long to wait.

Nanomaterials could offer a faster, cheaper solution. Combining non-toxic nanomaterials with antibiotics, Obare says, can create new delivery methods for life-saving drugs that overcome the processes bacteria use to become resistant.

"We're using the same old drugs, but in ways that trick the bacteria – we're bypassing their usual resistance methods," she says.

Another project is the development of nanomaterials to detect organophosphorus pesticides.

Recent studies have shown that pesticides can linger on farms for extended periods of time after they are sprayed. As a result, pesticides have been found in the meat of farm animals and in milk.

Why is this a problem? Pesticide-laden food can affect our neurological systems.

Obare's team has spent years perfecting sensors to detect pesticides and is now developing a device farmers could use to test their products. Ultimately, consumers could use it to test their own food at home.

It's this kind of work – research that bridges disciplines to impact human lives – that excites Obare.

"One of the things I love about UNCG's strategic plan is the focus on community," she says. "We have an opportunity to really think about the big problems that communities are facing right now. How can we, as scientists and engineers, use our knowledge and the integration of the sciences through nanotechnology to address these issues?"

By Alyssa Bedrosian • Learn more at go.uncg.edu/obare

Obare is a recipient of NSF's CAREER award and its American Competitiveness and Innovation Fellowship, among others. This year, the new dean of UNCG and NC A&T's Joint School of Nanoscience and Nanoengineering was named a fellow of the American Chemical Society, in recognition of her outstanding contributions to science.