



# RESEARCH2REALITY

Shining a light on research & innovation.

## A Microscopic Magic Bullet

| An interview with Professor Frank Gu  
| Language Psychologist, University of Waterloo

### What is a multifunctional nanomaterial?

We use nanotechnology to build materials that are smart. I come to work every day, I work with my students and building smart materials at the nanometre scale. A nanometre is very small. So we're looking at one millionth of the size of our hair.

### What are smart materials?

Smart materials are the ones that are designed to change their properties in response to external stimuli: electrical current, magnetic field, pH, temperature. What we want to do is to build these materials to respond to these types of stimuli and to perform its specific function. And then we're using them to apply them for applications in environmental protection, in medical science, and agriculture. We want to see how materials are formed, how to change them, how to control the change, and to what degree do they change? So that sounds kind of dull, but the application becomes very cool.

### What does the future hold for your research?

We're at the point that we can make materials at a nanometer resolution. And this is something that we thought was quite easy to do 10 years ago, but it wasn't. And now, not only are we able to do this, but we can do this at a reproducible manner and a scalable manner. Five to ten years from today, we are at a very exciting stage. Instead of performing one particular function, now we can perform multiple functions at a time. For example, in medicine, we always talk about something that can be used as a magic bullet, that can do a diagnosis, do imaging and treatment all in one step. So now with nanotechnology, it's coming and it's going to be awesome.