

Teeny Tiny SCIENCE

When she was about ten, **Youqi Wang** had her own simple weather station. Early each morning and last thing at night she would check it and write down the temperature, humidity, atmospheric pressure and rainfall. In one class project, students observed birds and insects and recorded their responses to weather changes.



Photo credit Kansas State University Department of Mechanical and Nuclear Engineering

Once her class made glider airplanes out of wood and very light paper. “We would fly the planes like kites and let them go up until they disappeared. I didn’t know it at the time, but it was all related to aerodynamics,” she recalls.

Today, Youqi Wang still experiments. As a professor of mechanical and nuclear engineering at Kansas State University in Manhattan, she works with manufacturing and advanced materials.

Her recent projects have to do with nano-technology, which has been called “the science of the small.” In nano-technology, things are measured by nanometers, which is a billionth of a meter. That means she works with the atoms and molecules that make up materials. By building materials at the molecular level, sort of like the way you arrange and rearrange blocks to get the result you want, Wang can design new materials that meet special needs.

For example, she has worked with designing “smart” materials that have the ability to sense heat, pressure or force and then respond based on these elements. This is very important to NASA in the area of remote robotics to use in research on the moon or Mars.

Another use for “smart” materials is in bio-technology. Wang says it may be possible to make artificial muscle for use in the human body that imitates the structure and function of muscles.

Wang has also worked with making lightweight and super strong material to be used in making planes or spacecraft. Currently materials for airplane parts are made in layers and bonded using heat or pressure. Sometimes the layers separate. Wang developed a way to weave fibers into the structure so they cannot separate, making the plane stronger.

Currently, her main project is one for the U.S. Army. She is working on material ballistic strength—materials that resist high-speed penetration in two areas, body armor and combat vehicle armor.

To students working on a science project for school, Professor Wang has some advice. The most important thing is patience and hard work,” she says.

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