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Engineering

## NanoFab facility update almost done

*New equipment will allow researchers to work at an even smaller scale.*

By [C J Patton](#)*The Shorthorn staff*

Upgrades to the NanoFab Research and Teaching Facility on Cooper Street are nearing completion with the addition of four pieces of technology and additional laboratories totaling \$4.6 million.

Zeynep Çelik-Butler, NanoFab director and electrical engineering professor, said the renovations have been planned since 2001, and the completions mirror the facility's overall improvement since that time. The renovations are expected to be finished this fall.

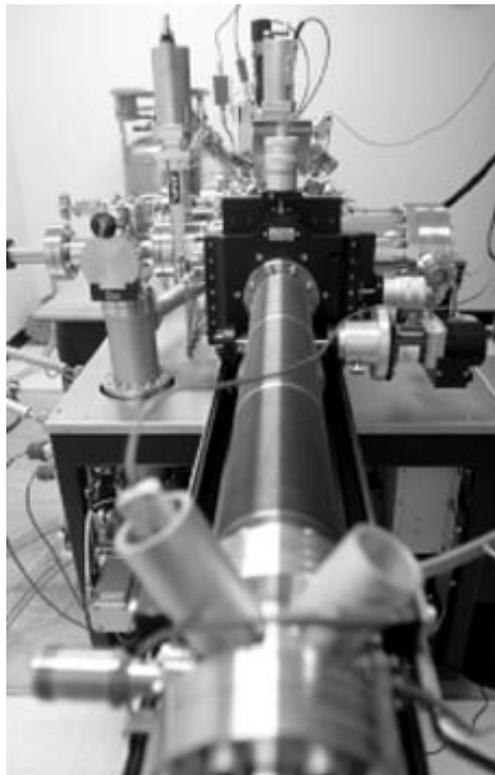
"We grew from two or three faculty members in 2001 to 25 faculty now," she said. "Now, we have companies coming in requesting to use the facilities."

Dr. Çelik-Butler said the tools and labs will be used for analyzing and constructing objects on a nanoscale, about 40,000 times smaller than the width of a human hair. One of the new pieces, a scanning and tunneling microscope, allows construction on a previously unknown scale.

"The equipment is used for fabrication of nanoscale devices and to be able to characterize them at nanoscale," she said. "We can actually take atom by atom and move them around."

She said nanotechnology innovations have the greatest potential impact in medicine and military science, fields in which "bigger is not better."

"If you're in surgery, do you want a large cut that runs your entire body, or do you want as small a cut as possible?" Çelik-Butler said. "If you're a soldier, and you have a



The Shorthorn: Mark Roberts

An R.H.K. ultra-high vacuum Scanning Tunneling Microscope with surface preparation chamber is just one of the new pieces of equipment in the NanoFab Research and Teaching Facility.

chemical analyzer, do you want to carry a big box of machinery, or do you want something that can fit on your sleeve?"

Wiley Kirk, electrical engineering professor and founder of the NanoFab facility, said nanotechnology research often has direct impact on military science. Nano-optics, or building sensors on a nanoscale, has great potential for surveillance uses, giving soldiers what amounts to X-ray vision, he said.

"There's a program underway in which terahertz are being used in nano-optics," he said. "The idea there is that you can look between walls and see objects behind walls."

Bioengineering chair Khosrow Behbehani said nanotechnology could offer something revolutionary to the medical field, with the ability to program nanomaterials to perform specific tasks, such as drug delivery.

"Basically, the idea would be to encapsulate or form the drug into nanoparticles," he said. "They can code these nanoparticles so they can attach themselves to a specific organ."

It is these kinds of tasks that make nanotechnology so important, Çelik-Butler said. With this new field, scientists are able to accomplish things that would be impossible on a larger scale.

Nanotechnology is considered very effective in following the basic engineering belief that smaller is better, and it predicts a greater emphasis on miniaturization in the future for other fields, Çelik-Butler said.

"The reason why we have to do things at a larger scale is because we're unable to do things at nanoscale," she said. "Not vice versa."



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