New atomic force microscope advances materials research

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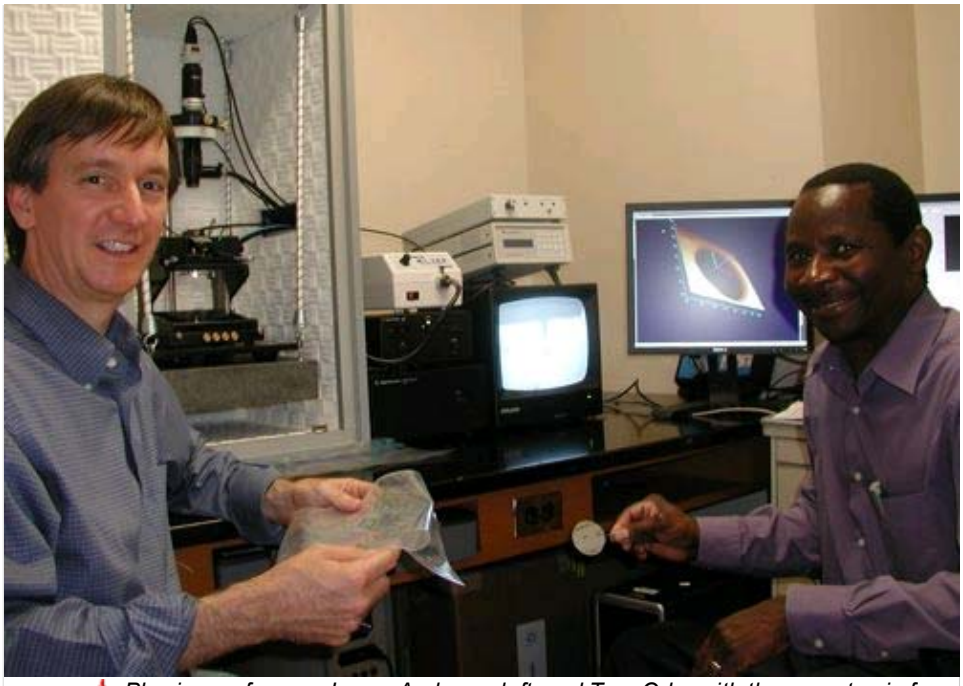
A new microscope that can make surface profile measurements on the order of a billionth of a meter is now part of the Department of Physics and Astronomy at YSU.



Physics professors James Andrews, left, and Tom Oder with the new atomic force microscope in Ward Beecher Hall.

The $150,000 atomic force microscope, which has the capability to image small objects down to the size of an atom, was funded as part of a $900,000 grant from the Ohio Research Scholarship Program. The program provides grants to strengthen and increase the number of collaborative research clusters across the state.

The grant will help YSU advance its research into the surface of materials such as polymer multilayer structures being developed in collaboration with Case Western Reserve University as part of a National Science Foundation–supported Center for Layered Polymeric Materials, with which YSU is affiliated.

YSU received the allocation of $900,000 as part of a $15 million grant to the Research Cluster on Surfaces in Advanced Materials, of which YSU is a member along with Kent State and Case Western Reserve universities.

James Andrews, professor of Physics and Astronomy, said the cluster was formed in response to a fall 2007 joint request for proposals from the Ohio Department of Development and Board of Regents under the Ohio Third Frontier Initiative.

The AFM has a tiny probe tip which scans the surface of a material to create a 3–D image, as opposed to using traditional microscope techniques which utilize light to display a two–dimensional image.

"It has become one of the fundamental tools for looking at surface materials," Andrews said.

Andrews, along with YSU physics professor Tom Oder and research scientist Guilin Mao, are the only members of the faculty who have been trained to work with the instrument so far, though they are looking forward to broadening its use and incorporating the microscope into the classroom.

"In addition to involving YSU students in our research efforts, coursework based on the AFM will be integrated into our upper–division courses on condensed matter, semiconductors and advanced instrumentation," Andrews said.

The remaining grant funds will primarily be used to purchase other instruments, including an optical parametric oscillator (tunable laser source), a Raman Microscope, a solar stimulator, a programmable spin coater and various related pieces for studying surfaces.