

Media Contact: For assistance in reaching the expert highlighted below, contact Mick Kulikowski, News Services, 919/515-3470 or [mick\\_kulikowski@ncsu.edu](mailto:mick_kulikowski@ncsu.edu).

Dec. 22, 2004

## NC State Researcher Shows Nanoscale Images of Butterfly Wing

Scanning probe microscopy (SPM) imaging techniques capable of achieving nano- and atomic-scale resolution are usually applied to advanced ordered materials such as semiconductors, carbon nanotubes and superconductors. A nanometer is one-billionth of a meter.

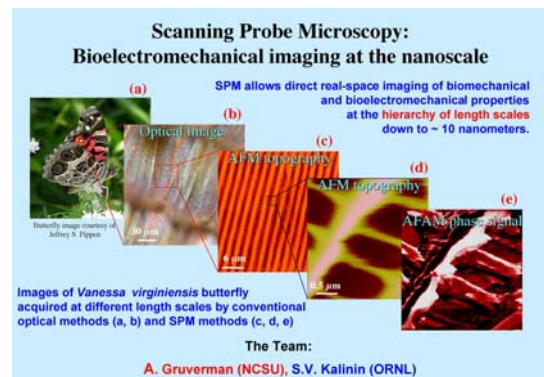
But now, Dr. Alexei Gruverman, associate research professor of materials science at North Carolina State University; Dr. Brian Rodriguez, a postdoctoral researcher at NC State; and Dr. Sergei Kalinin, a Eugene P. Wigner Fellow in the Condensed Matter Sciences Division, Oak Ridge National Laboratory, have applied SPM to living biosystems – this time to look at the structure of the butterfly wing.

The 5-nanometer resolution images of *Vanessa virginiensis* (American Lady) butterfly, obtained with a technique called atomic force acoustic microscopy, depict the infinitesimally complex structures that underlie the functionality and delicate spectacle of the flying insect's wing. Researchers can see nanometer-sized structural elements at resolutions that roughly equal the size of a single protein fibril composed of several molecules.

Gruverman says that characterization of electromechanical and elastic properties in biological systems at different length scales holds keys to unraveling the fundamental mechanisms of such processes as tissue growth and regeneration.

Kalinin adds that the butterfly images are just a proof on concept – the new strides in advanced scanning probe microscopies will eventually provide a “wonderful tool” for

- more -



A poster showing various magnifications of a butterfly wing. Slides (a) and (b) show conventional optical methods, while slides (c), (d), and (e) show scanning probe microscopy methods.

*News Tip - 2*

understanding, as well as viewing, properties and functionality of living biosystems on length scales from macroscopic to molecular.

Gruverman can be reached by phone at 919/513-3319 or by e-mail at [alexei\\_gruverman@ncsu.edu](mailto:alexei_gruverman@ncsu.edu).