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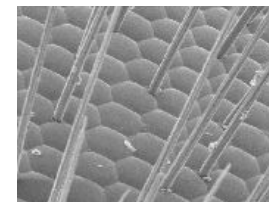

Eye of a Bee

Shiloh Pointe Students Experience Bugscope

Published Apr 11, 2007, 8:26am
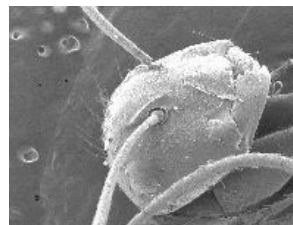(Updated Apr 11, 2007, 8:26am)

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On April 19 Gwen Stanley's class at Shiloh Pointe Elementary will have the opportunity to get up close and personal with some real creepy-crawlies.

Researchers at the Beckman Institute for Advanced Science and Technology at the University of Illinois are using the latest technology to allow students in grades K-12 to explore the furriest, scaliest and slimiest details of those ever-popular creatures: bugs. The program, known as "Bugscope," brings kids together with both science and bugs.

"We want to bring our high-end scientific laboratory right to the student," says project director Benjamin Grosser. "Most kids are fascinated by bugs and bugs are easy for kids to find and collect. "Bugscope brings bugs and technology together so that children can investigate and experiment just as scientists do."

Ant Head

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Members of the Beckman Institute's Imaging Technology Group (ITG) have made their Environmental Scanning Electron Microscope (ESEM) available to school groups that successfully apply to the Bugscope program. An ESEM uses sophisticated technology to examine objects in great detail, allowing students to see bug parts undetectable to the naked eye or with a conventional microscope.

Using software developed by ITG, students control the ESEM in real-time over the Internet. With a constant streaming video feed of the ESEM's image, and control over magnification, focus, and stage navigation (among others), classroom teachers anywhere in the world help their students conduct research on the bugs of their choice.

Bugscope serves as a jumping-off point for many in-class projects, such as a thorough study of entomology, an understanding of microscopy, and a basic understanding of what is involved in scientific research. In addition to traditional classes, home schools, after-school programs and summer camps have participated in Bugscope.

Bugscope encourages hands-on science by requiring the classrooms to mail their own specimens to the Beckman Institute. This ensures that the students have a connection with the object of study, giving them a sense of inclusion that they don't get with a conventional textbook full of microscopy images. To further aid the students and teachers, Daniel Weber, Bugscope's project manager, and Scott Robinson, Bugscope's ESEM engineer tirelessly 'chat' with the students during each session, helping to identify insect parts and answering questions about the technology. Since Bugscope began, close to six years ago, Weber and Robinson have become quite adept at insect identification.

Meanwhile, ITG has been exploring ways to extend the Bugscope experience to everyone, even those that don't apply to the program. Toward that goal, ITG recently finished development a Virtual Microscope. The Virtual Microscope mimics the Bugscope interface, and provides a similar set of controls that allows users to navigate around high-resolution, high-magnification pre-captured image sets from scanning electron, light, and scanned probe microscopes.. The magic behind the Virtual Microscope is ITG's custom-automated data-collection tools, which capture the thousands of images needed to accurately describe a particular sample. The result, which was funded by NASA, is like having a downloadable Bugscope that can run on any computer in the world. This package is available free from the Virtual Microscope website at http://virtual.itg.uiuc.edu.

So far, over 6000 students from 37 U.S. states and several countries (including Ireland, Britain, Australia, Canada, and Mexico) have collected more than 44,000 images during the course of their Bugscope sessions. Use of the program has increased consistently since its inception in 1999, and is now serving about 50 schools each year.   According to Bugscope's educational outreach coordinator Umesh Thakkar, "We're doing it because it's a good thing, the right thing to do, and we're doing it also because we think it's a great model for science outreach." For more information about signing up for Bugscope, contact bugscope@bugscope.beckman.uiuc.

edu or visit the website at http://bugscope.beckman.uiuc. edu.

Funding for Bug scope is provided by the Refraction Research Foundation. Previous funding was provided by the Illinois Consolidated Telephone Company. Support for purchasing the ESEM was provided by the National Science Foundation and The Beckman Institute. Other funding was provided by the IBM Shared University Research Program and the Informix Software Innovation Grant Program.

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