BROOKHAVEN NATIONAL LABORATORY

Laboratory Link

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Building 130, P.O. Box 5000
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Phone: 631 344-2345 Fax: 631 344-3654
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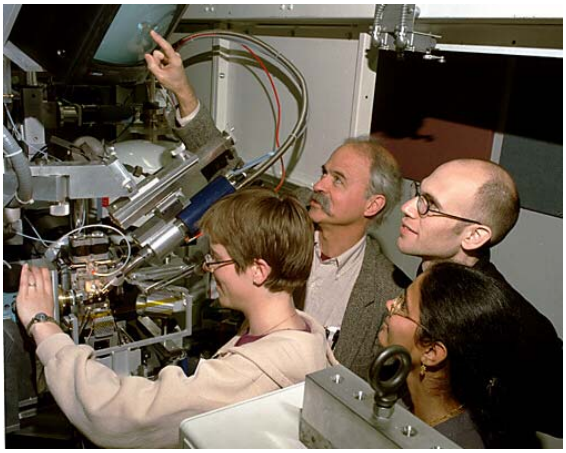
Hands-on Training Course Draws Students from Around the World

- Brookhaven's National Synchrotron Light Source (NSLS) was extra busy the last week in April as a group of 48 students from around the world participated in a week-long hands-on training course developed by Bob Sweet, a Brookhaven Lab biologist.
- The course focused on rapid data collection and molecular structure solving at the NSLS, and was developed to introduce students to some of the best people, newest equipment, and latest techniques in the field of x-ray crystallography.
- "Half the students had brought their own specimens to study, and it was thrilling to see them so riveted with the learning process and the research," said Sweet. "Half a dozen got publishable results."
- X-ray crystallography is a technique used to decipher the structure of large molecules, including proteins from bacteria or viruses responsible for diseases such as Lyme disease, HIV, and the common cold.



At the NSLS (clockwise from left), Emma Jakobsson from Uppsala University, Sweden; Bob Sweet of the Biology Department; Oren Rosenberg from Rockefeller University & Yale University; and Srikripa Devarakonda from the University of Virginia.

Brookhaven Scientists Awarded Patent for New Method of Making Metal Oxides

- Lab scientists were recently issued a patent for a novel way of making metal oxides.
- This class of compounds, which includes magnesium oxide (a key ingredient of numerous products, including the stomach-settling formula Milk of Magnesia) and zinc oxide (famous for its place on lifeguards' noses), is commonly used in catalysts and cosmetics, and is important to the growing field of nanotechnology (billionths of a meter).
- The new method results in the ability to produce metal oxide powders with uniform particle sizes anywhere from five to 500 nanometers. It also allows scientists to add other elements to make more complex particles. These additives can alter the electrical, optical, and magnetic properties of the final product so they can be tailored for a variety of uses.
- "I can't even imagine all the potential uses of this technique," says John Larese, one of the chemists who developed this technology. "Our goal right now is to explore the range of materials we can produce by this method. The excitement is going to be discovering the things that other people haven't thought of."

(over)

Biodiversity Increases Ecosystems' Ability to Absorb CO_2 and Nitrogen

- FACE (Free-Air CO_2 Enrichment) is an experimental technology developed by researchers at Brookhaven Lab to study the effects of enhanced CO_2 on plants in their natural environment, rather than in greenhouses or other enclosures.
- In a FACE system, an array of vertical pipes encircling a test area releases CO_2 in a computer-controlled mixture with ambient air. Measurements of wind direction, wind speed, and the CO_2 concentration in the FACE plot are monitored and sent to a computer that uses this information to adjust the rate of gas released on a second-to-second basis.
- Currently, there are BNL-designed FACE systems in many locations, including Arizona, North Carolina, Neveda, Minnesota, Germany, and Switzerland. Many scientists can participate in FACE experiments operated as user facilities.
- Some of the plant systems being studied include crops such as wheat, cotton, and sorghum, and natural ecosystems such as maturing pine forests, deserts, and prairies.
- In April 2001, collaborators from the Lab and several universities working in Minnesota at a FACE facility reported that more diverse plant ecosystems were better able to absorb carbon dioxide and nitrogen, both of which are on the rise due to human activities and industrial processes.
- "These findings suggest that protecting biodiversity worldwide will contribute to safeguarding the capacity of ecosystems to capture a larger fraction of additional carbon and nitrogen entering our environment," says Brookhaven ecologist George Hendrey, who led development of the FACE system and is a coauthor of the current study.
- For more information, visit http://www.face.bnl.gov/Default.htm .

The FACE research facility in Duke Forest, North Carolina

Upcoming Concerts Open to the Public

- *Jenny Mitchel, piano & Gili Sharett, bassoon, May 9, noon, Berkner Hall*: This duo of Stony Brook doctoral students have extensive careers as soloists, playing throughout North America, Europe, and Israel. Free.
- *Gloria Cho & Ying-Chien Lin, May 23, noon, Berkner Hall:* Gloria Cho, oboe, received her artistic training at Seoul Arts middle school and high school. She played with the Korean Symphony Orchestra as a soloist. Ying-Chien Lin, piano, excels in both the virtuoso Russian literature as well as works by German composers. Free.