UNL STUDENTS CONDUCT MATH, BIOLOGY RESEARCH IN BORNEO

Lincoln, Neb., July 21, 2008 -- Four undergraduate students from the University of Nebraska-Lincoln recently returned from a six-week study abroad trip to Borneo. The goal of this program is to integrate undergraduate education and research at the interface between mathematics and biology, which is an important emerging scientific arena.

Borneo, at the southern end of the South China Sea, is the third-largest island in the world (287,000 square miles) behind Greenland and New Guinea. The sultanate of Brunei is on its northwest coast. The rest of the island is divided between Indonesia and Malaysia.

The study-abroad course brings together UNL students and faculty members in ecology and mathematics to guide students in a research project to answer a scientific question of their own design.

Students Brett Bogenrief of Minot, N.D., Katherine Heineman of Norfolk, Ethan Jensen of Carleton and Autumn Shapland of Bellevue, led by UNL ecologist Sabrina E. Russo, spent most of their time in Borneo collecting data at Lambir Hills National Park in Sarawak, Malaysia. The park has one of the largest and last remaining tracts of lowland mixed dipterocarp forest, which is a forest type that has become tragically scarce from the demand for tropical timber.

Lowland mixed dipterocarp forests are famous for having very tall canopies. Trees can grow to be nearly 230 feet in height. That means competition for a spot in the canopy, where trees have more light, is fierce. The students' project examined the growth strategies of trees in relation to their light and soil environments to understand the development of the vertical structure of the forest. They measured tree heights, crown dimensions and leaf characteristics to test whether tree species growing on different soil types have different growth strategies that enable enhanced resource-capture and competitive ability in reaching the canopy.

The students are now working with Russo, an assistant professor of biological sciences, to analyze their data. In the fall semester they will work with UNL mathematician Richard Rebarber to develop a mathematical model describing the process of tree growth using their data set.

Since the four students had little experience traveling internationally, there were many new experiences in store for them, in addition to the challenge of conducting field research. They celebrated Gawai, the traditional festival celebrating the rice harvest, with the family of Russo's field assistant, a member of the indigenous Iban people. They all dressed in traditional Iban costume and visited with new friends in the nearby long-house, which is the traditional Iban dwelling. They also had the opportunity to hike in Niah National Park, which is famous for its nearly 40,000-year-old cave paintings, and Bako National Park, which has lovely beaches along the South China Sea. They also had just enough time once data collection was completed to spend a few days in Singapore and Kuching (the capital city of Sarawak), visiting museums, mosques, and Hindu and Taoist temples.

In addition to hands-on experience in research, the course helps students develop skills needed in their future careers, such as the ability work well in teams, think critically and solve problems and synthesize information.
Heineman is a junior biological sciences major and is the daughter of Greg Heineman and Debbie Deming. Jensen's major is fisheries and wildlife management and he is the son of Jonathan and Patti Jensen. Bogenrief is a junior majoring in biochemistry. Shapland is junior in pre-medicine, majoring in mathematics, and is the daughter of Greg and Trish Shapland.

The trip was part of the Research for Undergraduates in Theoretical Ecology program, which is funded by the National Science Foundation and co-directed at UNL by Chad Brassil, assistant professor in the School of Biological Sciences, and Glenn Ledder, professor of mathematics.