

Far Out! NC State to Provide Experimental Plants for International Space Station Studies

A proposal by North Carolina State University researchers to put genetically modified plants on the International Space Station to study the effects of fractional gravity on the plants' signaling processes has been accepted by NASA.

The project, says Dr. Christopher Brown, a research associate professor of botany at NC State and director of space programs for the Kenan Institute of Engineering, Technology & Science, housed at NC State, will represent an important step toward learning more about how plants respond to the weightless conditions in low earth orbit, or to gravity levels found on the moon or Mars.

The research would entail sending into space Arabidopsis, or mustard weed, plants that have been genetically altered with reduced levels of IP3, a molecule that is critical in converting stimuli into biochemical events. Arabidopsis is frequently used in scientific experiments because it develops, reproduces and responds to stress and disease in much the same way as many crop plants. The entire genome of Arabidopsis has been sequenced, allowing researchers to delve into the genetic basis for many plant responses.

On Earth, reduced levels of IP3 in modified plants translate into slower and diminished response to changes in the direction of gravity on Earth. "When the modified plants are tipped, the shoots and roots do not reorient as quickly or as completely as wild-type plants - those that are not genetically modified," Brown says.

Now, the NC State research team, which includes botanists Dr. Wendy Boss, Dr. Imara Perera and Dr. Heike Winter-Sederoff, is looking to see if these responses change under no gravity, or weightlessness; one-sixth gravity, which represents gravity on the moon; and three-eighths gravity, which represents gravitational conditions on Mars.

"One of the earliest plant responses to changes in the direction of

gravity on Earth is a change in levels of IP3," Brown says. "This in turn causes increases in cellular levels of calcium, for instance, and other levels of gene expression starting a cascade of events that eventually leads to the plant response - which is to bend. We want to see if the different gravity levels - weightless, moon and Mars - result in a similar response in our altered and wild-type plants."

To test plant responses at the different gravitational conditions, the NC State plants - both wild-type plants as well as the genetically manipulated plants - will spin inside an International Space Station centrifuge, a machine that accelerates plants to produce artificial gravity. According to Brown, "Other than being on the surface of the moon, Mars or another smaller planet, this is the only way to get gravity levels between 0 and 1."

But before the plants go into their cosmic spin, the NC State researchers will work to ensure the plants are safe within the centrifuge. Since there's not a lot of room on the International Space Station, the centrifuges are small - "about the size of a small suitcase," Brown says - and the plant-growing chambers are smaller yet, no larger than a brick.

To get to the International Space Station, the plants must travel on a NASA space shuttle. Craft like the Russian "Soyuz" or "Progress,"

Student Videos Airing on People's Channel in Chapel Hill

Videos created by students in Rob Kehoe's classes at East Chapel Hill High School are airing at 9 p.m. on cable channel 8.

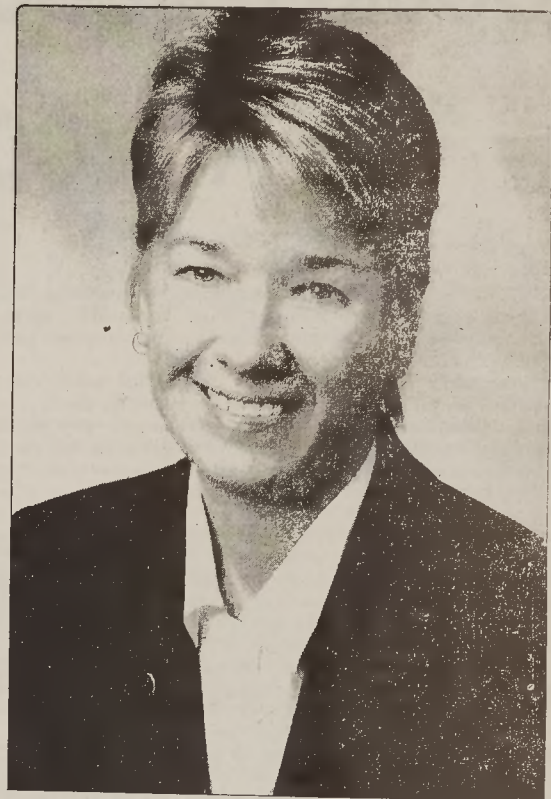
Most shows contain three or four video clips created by the high school students from Chapel Hill High School and East Chapel Hill High School. They include documentaries and "mockumentaries," said Kehoe.

Kehoe, who is an instructor funded through Alamance Community College, teaches three sections of videography at East Chapel Hill High School, including one class for Chapel Hill High School students. He also teaches two sections at Cedar Ridge High School in Hillsborough.

The series of videos will be re-broadcast on cable channel 8 on each following Friday at 9 and 3 p.m.

Kehoe's students have won second place and honorable mention in a video competition sponsored by the North Carolina Center for Voter Education. T.

spacecraft that are currently the only way to ferry crew, essential gear and supplies to and from the International Space Station, simply do not have enough room to carry up much else. The space shuttle's return to flight is scheduled for May or June 2005, and even then it may be one to two years before the experiment can fly. "No problem," Brown says. "There is a lot to do to get ready in the meantime."



DR. DEBORAH JAKUBS

DEBORAH JAKUBS TO HEAD DUKE LIBRARIES

Dr. Deborah Jakubs, director of collections services for Duke University's Perkins System Libraries, has been selected to become the Rita DiGiullonardo Holloway University Librarian and vice provost for library affairs, Duke President Richard H. Brodhead and Provost Peter Lange announced.

The combined book collections of Duke University's Library system, and the separately administered libraries serving the schools of business, divinity, law and medicine, total more than five million volumes, making it one of the largest academic library systems in the nation.

Jakubs' appointment takes effect Jan. 4. She succeeds David S. Ferrero, who on Sept. 1 became the Andrew W. Mellon Director and chief executive of the research libraries at the New York Public Library.

"Deborah brings great experience and vision to the leadership of our library system," Lange said. "Her knowledge of Duke and her management experience will serve Duke well as the library builds facilities and programs for a future in which scholars and students capitalize on new technologies to seek information in new and innovative ways. She is also a multi-lingual Latin American scholar who is well-suited to help ensure that the library is central to the university's internationalization programs."

In her new role, Jakubs will be responsible for administering eight libraries as well as the university archives and its records management program. She also will oversee the Center for Instructional Technology, which promotes the effective application of information technology in teaching and learning across the university.

In addition, Jakubs will preside over the completion of the renovation and expansion of the William R. Perkins Library on Duke's West Campus, the largest and most centrally located library at the university. The centerpiece of the project, which will cost \$52 million exclusive of upcoming renovations, is the five-story Bostock Library, which is under construction adjacent to Perkins and is expected to be completed in the summer of 2005. The Karl and Mary Ellen von der Heyden Pavilion, which is being built between Perkins and the languages building, is also scheduled for completion next summer.

An extensive renovation of Perkins, to begin in the fall of 2005, will include an information commons and a digital production center. The information commons will integrate print and electronic resources and digital capabilities in an environment in which library staff will provide one-on-one assistance or work with students and faculty in group settings to integrate technology into their research. Officials said the digital production center will convert distinctive library holdings and other campus resources into electronic formats for greater usability and accessibility.

Lange said Jakubs' leadership in planning for the Perkins' renovation and her experience in both print and electronic information make her the "right person to lead the libraries' efforts to address important challenges in integrating research, teaching and learning in the digital age" as Duke moves toward a conversion to the Library of Congress classification system.

Brodhead emphasized Jakubs' commitment to students and the balance she brings to print and electronic media. "Deborah is a scholar and proven administrator who will champion the interests of students as well as faculty," Brodhead said. "She has shown great enthusiasm for new electronic resources even as she has worked to build on Duke's traditionally strong collections of primary materials. As a historian, she has great respect for the unique place of print resources, but she also is excited about the new opportunities and breadth of access offered by electronic resources."

Jakubs said she was honored to be selected to succeed Ferrero and to lead Duke's libraries "at a time when academic libraries face great challenges and even greater opportunities to advance scholarship. Our libraries must become an even more attractive destination for students, a place that facilitates learning, teaching and the production of scholarship while creating intellectual community through public programming."

Jakubs earned a Ph.D. in Latin American history from Stanford University in 1986, and also received a Master of Library and Information Studies from the University of California, Berkeley.

In addition to holding positions of increasing responsibility since joining Duke in 1983, she has served as associate director and director of the Duke-UNC Program in Latin American Studies. Jakubs was the director of the Global Resources Program of the Association of Research Libraries from 1996 to 2002.

Jakubs has published numerous articles in scholarly and library journals and has made a number of presentations on library and information technology issues, as well as in Latin American studies.

Lange said that in her position as collections services director, Jakubs has shown "creativity in meeting the diverse needs of research and teaching and in collaborating effectively with academic administrators and faculty."

In her current position, she is responsible for the five departments that make up collections services, which together comprise nearly half the Perkins System staff. She oversees the \$8 million collections budget and more than \$1.6 million in annual income from endowments. She supervises the work of 35 librarians, who also work in partnership with the staff of the Center for Instructional Technology.

Jakubs was recommended, following a national search, by a committee chaired by Alex Roland, professor of history. The committee considered more than 30 candidates.

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