

**GOOD NEWS***In a class by herself***Student wins toxicology award for in vitro biology study**

By Eric Raub

As long as NASA has been sending humans into space, scientists have searched for ways to protect them from the hazards beyond Earth's protective barriers. Over the past year University of Notre Dame undergraduate Denise Fraga has worked to help JSC make future space flight even safer.

The Earth has several protective features shielding the relatively fragile life on its surface from the hazards of space—one of the most dangerous of these being toxic levels of radiation. Spacecraft and spacesuits are shielded against radiation bombardment, but exactly how effective is their shielding, especially over long periods of time?

In an attempt to find better ways to answer this question, Fraga worked together with Dr. Steven Gonda of the Space and Life Sciences directorate and Dr. Jacqueline Jordan, a Universities Space Research Association visiting scholar, to develop a new process in creating little "bio-reporters" on the toxic effects of radiation.

Fraga presented the findings at the 2001 Congress on In Vitro Biology, and walked away with the 2001 Cellular Toxicology Award, an honor normally presented to graduate students.



NASA JSC 2001e19243 photo by David DeHoyos  
Fraga, a Notre Dame undergraduate, works with some samples in her laboratory.

JSC has several unique laboratory machines called bioreactors that can grow tissues in an environment similar to microgravity. With the help of a bioreactor, genetically engineered cells can grow into tissues in a three-dimensional shape, similar to what would be found in a human body.

These little clumps of specially designed cells can be forced to grow around a scaffolding material. The scaffold slowly begins to degrade after it comes into contact with biological cells. When the scaffolding is finally gone, it leaves behind a specially designed tissue. This tissue can be subjected to toxic radiation and accurately report back on what the effects might be if the target of the radiation was an actual human.

While this is acceptable for long-term experiments, scientists on Space Shuttle flights do not have time to wait around for the scaffolding to deteriorate.

So Fraga and Drs. Jordan and Gonda worked to develop a process to tear the scaffolding down faster while still creating tissue samples that could effectively report back on experiments measuring cell mutation and other effects of radiation.

Dr. Gonda attributes the tenacious Fraga and

advances in genetic engineering, bioreactor technology and tissue engineering for JSC's success with the project and at the Congress.



NASA JSC 2001e19244 photo by David DeHoyos  
Denise Fraga, right, proudly displays her 2001 Cellular Toxicology Award plaque alongside her mentor, Dr. Jacqueline Jordan.

"She's a gifted student but also a student who goes the extra mile," Gonda said. "She has a very inquisitive mind, which can pull these three areas together and make connections. In just a year's time she's made a substantial contribution to something NASA has identified as part of its 'critical path.'"

Fraga admits the project cost her many an evening and weekend, but walking away with a plaque and making her presence and project known to a roomful of doctors and scientists gives her a certain amount of satisfaction.

"It was fun but it was definitely a lot of work," Fraga said. "I put in a lot of overtime and weekends....It was my first scientific conference and it was really

great to have scientists, medical doctors and pharmaceutical executives interested in my project."

Dr. Jordan, who worked closely with Fraga providing knowledge, experience and encouragement, enjoyed learning that the hard work of her student had earned recognition at the Congress. She and Fraga have plans to further publicize the project and draw more attention from an already attentive in vitro biology community.

"It was nice to see some recognition of her hard work," Jordan said. "We plan on submitting a paper to the In Vitro Biology Society paper. A lot of people are interested in this work so we'll probably see where we can take it from there." ■

**Fredrickson selected to participate in Frontiers of Engineering symposium**

Eighty-one of the nation's top young engineers have been selected to participate in the National Academy of Engineering's (NAE) seventh annual Frontiers of Engineering symposium. One of them is JSC's Steven Fredrickson, an engineer in the Automation, Robotics and Simulation Division.

The three-day event will bring together engineers, ranging in age from 30 to 45, who are performing leading-edge engineering research and technical work. The participants, nominated by fellow engineers or organizations and chosen from a field of nearly 170 applicants, are from industry, academia and government.

"Frontiers of Engineering is a rare opportunity for outstanding young engineers to meet one another and delve into new topics for possible future collaboration," said William A. Wulf, NAE president. "These talented individuals represent the future leaders in the field. Having them get to know each other can have a tremendously positive impact on the directions in which engineering is headed."

The symposium will be held September 13-15 at the National Academies' Arnold and Mabel Beckman Center in Irvine, Calif.

It will feature topics in the areas of aeronautics and aerospace, civil systems, wireless communications and technology and the human body. Nicholas Donofrio, senior vice president and group executive, Technology and Manufacturing, IBM Corporation, will be a featured speaker.

The National Academy of Engineering is an independent, nonprofit institution that serves as an adviser to government and the public on issues in engineering and technology.

Its members consist of the nation's premier engineers, who are elected by their peers for their distinguished achievements. The NAE, established in 1964, operates under the congressional charter granted to the National Academy of Sciences in 1863.

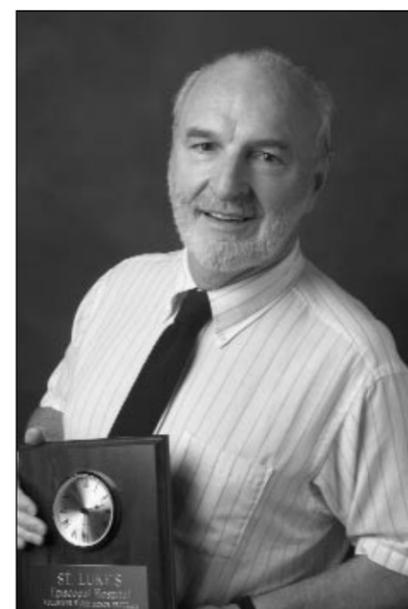
For more information on Frontiers of Engineering please visit: <http://www.nae.edu/NAE/NAEFOE.nsf>

**Raymond Lee and Brian Schoonmaker were recently presented with a plaque to recognize their generous donations of blood to St. Luke's Hospital.**

NASA JSC 2001e20599 photo by Robert Markowitz

**Raymond Lee**

Lee, a Program Analyst in the Engineering Resources Management Office, began donating blood at JSC in 1978, continuing the habit he got into from when he donated while serving as a Navy Corpsman attached to the first Marines in Vietnam in 1968.



NASA JSC 2001e20601 photo by Robert Markowitz

**Brian Schoonmaker**

Schoonmaker, a Senior Software Engineer with the Science Applications International Corporation on the Safety, Reliability and Quality Assurance contract, began donating in college and continued with employers in California and St. Louis before coming to Houston in 1968.

The next blood drive is Aug. 1 and 2 in the Teague Lobby and the Donor Coach at Bldg. 11.