



SPACE EXPERTS

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Scientific Experiments in Space



Taylor G. Wang, Centennial Professor of Materials Science and Engineering; director, Center for Microgravity Research and Applications; and former NASA scientist/astronaut—can discuss the importance of the scientific experiments that have been conducted over the years in space and their practical applications on earth. Wang flew on the space shuttle *Challenger* in 1985 and has supervised two other research experiments in space. Those experiments, looking at how drops of fluids behave in near-zero-gravity, have helped Wang and his colleagues in their

quest for creating a “perfect capsule” that could lead to improved treatments for diabetes, Parkinson’s and other hormone-deficient diseases. That capsule, or protective shell, would contain living cells that could be transplanted successfully into the body, something not possible today. Wang says only the minimum gravity of space can provide the insight necessary to create a capsule made of material strong enough to withstand an attack by the body’s immune system, yet porous enough to allow absorption of time-release therapies.

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Importance of Space Exploration



Rick Chappell, executive director, Dyer Observatory at Vanderbilt; former associate director for science at NASA’s Marshall Space Flight Center in Huntsville—can discuss the educational, technological and scientific importance to the United States of a return to the moon and a manned mission to Mars. Chappell says returning to the moon will influence children to have careers in

science and technology and will lead to unprecedented advances in technology. While with NASA, Chappell served as an alternate payload specialist on a 1992 space shuttle mission and was mission scientist for Spacelab 1 from 1976 to 1985. Chappell can also discuss the importance of finding fossil evidence of past life on Mars—which may have a completely different genetic structure than life on Earth—as well as the implications of finding remaining pockets of water on Mars.

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Robots in Space



Alan Peters, associate professor of electrical engineering—Peters is a member of Vanderbilt's Center for Intelligent Systems, where he directs research on the humanoid robot, ISAC, and on various mobile robots. He is also part of the DARPA/NASA robonaut research team, which is developing humanoid robots that would likely play a key role in a new moon mission or Mars trips. He developed the software that gives the robot a short-term memory enabling it to adjust to changing environments. The robonauts work outside of the spacecraft to make repairs and act as assistants on a variety of tasks, protecting the safety of the astronauts. A goal of the project is to develop a robot that learns through its own experiences and eventually interacts naturally with people. Peters was a NASA summer faculty fellow at the NASA Johnson Space Center in Houston, Texas, in 2000 and 2005. He has published numerous research papers and lectured frequently on this topic.

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Radiation in Space Travel



Ron Schrimpf, professor of electrical engineering; director, Institute for Space and Defense Electronics—Schrimpf leads the Radiation Effects Research Group at Vanderbilt, the largest group of its type at any American university. He can discuss the needs and challenges of designing systems capable of surviving the high radiation environment of interplanetary space on long missions. Schrimpf is also the director of the Institute for Space and Defense Electronics, which performs design, analysis and modeling work for a variety of space and defense-oriented organizations.

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