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Higher Education is Crucial to the continuing success of space exploration, and nobody knows this better than NASA. Colleges and universities are a gold mine for the type of creative efforts and technological innovation needed to propel exploration efforts to the next level. And NASA has created a number of programs designed to promote this scientific progress.

Higher Education Is a Launching Pad to Outer Space

By Terri Williams
The university teams who compete in the Robotic Mining Competition must submit an application and be endorsed by a university faculty member. The first 50 applications are accepted. In 2013, participating colleges from around the country included Montana State University, the University of Arkansas, Virginia Tech and the University of Alabama at Huntsville. International teams came from countries that included Poland, Canada, Australia and India. The winning team receives the Joe Kosmo award for excellence, a $5,000 scholarship and an invitation to attend an upcoming launch at the Kennedy Space Center.

“Researchers at KSC benefit from the Robotic Mining Competition because they have the opportunity to observe dozens of creative, innovative design—from vehicles to components to remote control options—at one time, in one setting,” said Hortense Diggs, KSC’s education director. “And by immersing students completely in the design and fabrication of these robots, NASA is fostering a greater interest in STEM careers.”

STEM careers involve science, technology, engineering and math skills. But NASA’s association with universities is not limited to STEM students.

The NASA Wearable Technology Symposium provides an opportunity for students from a cross-section of majors to present designs, strategies and ideas that integrate electronics and fabric. Mentors from the Johnson Space Center in Houston work with college students across disciplines to produce cutting-edge inventions that combine fashion and function.

One idea that came from the partnership are boots that allow astronauts to manipulate controls with their toes. Virginia Tech engineers and computer science majors worked with industrial design and architecture students to create a concept that puts a jetpack control system in the boots of a spacesuit. By depressing the toes, astronauts can move forward; raising the toes causes backward movement. The design allows astronauts to use
College students run an experiment in a microgravity environment as part of the Reduced Gravity Education Flight program.

The Experimental Project to Stimulate Competitive Research, or EPSCoR, is a collaborative effort between NASA, higher education and industry that seeks to level the playing field in states and regions that have not been able to compete for federal research and development awards.

EPSCoR serves several purposes: It improves the targeted area’s research infrastructure and research and development capacity in jurisdictions that are important to NASA’s mission. It also increases the quality of science, technology, engineering and mathematics education in those regions. Combined with economic development, the program improves the potential for these jurisdictions to compete for NASA grants and support from other areas.

NASA EPSCoR provides two types of awards. “Research Infrastructure Development or RID awards enable states to build and strengthen relationships and improve contacts with NASA researchers and to develop ideas for future proposals,” said Lenell Allen, director of Aerospace Research and Career Development.

The second type of awards are Research Awards. “Research awards result from topic-specific proposals targeted at high-priority NASA research and technology development needs in earth and space science, human exploration, aeronautics and space technology,” Allen said.

For example, researchers at the University of South Alabama discovered a way to produce stitched-fiber reinforced polymers, which adds both adhesion and mechanical interlocking between carbon fibers and nanofibers. This invention will result in stronger, yet lighter aerospace materials.

In addition, the University of Nebraska has developed a Radio Frequency Identification and Location system that can allow doctors to follow food or medication from the manufacturing process to the time of consumption.

On a yearly basis, EPSCoR solicits research proposals for three-year research awards. The maximum amount of each research award is $750,000. The number of awards given varies from year to year and is dependent on the available budget.

Allen said the National Science Foundation determines overall state eligibility for EPSCoR. “This provides states that have been traditionally less competitive in receiving federal research and development awards with opportunities that stimulate sustainable improvements to their research and development capability and competitiveness,” said Allen.