

# The Sky's The Limit

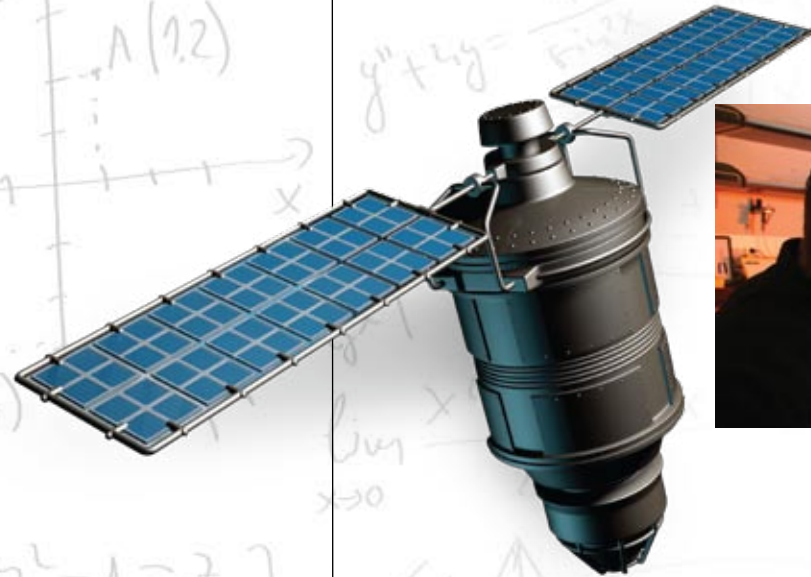
by kalene mccort

Taoist philosopher Lau Tzu astutely said, "For the wise man looks into space, and he knows there are no limited dimensions."

Andrew Ketsdever, UCCS assistant professor in the department of mechanical and aerospace engineering, lives this very sentiment. From spotting the constellations by sight at the age of six to now configuring different ways for a rocket to take off, he still possesses an imaginative mindset in which the possibilities are endless.

As a child, Ketsdever was filled with the desire to learn more about the world outside of his own.

"I remember first looking at the constellation of Orion and seeing through the telescope various red and blue stars and nebula," he said. "I always wondered what those things were and why they were different from the things I knew about where I lived."



In high school, Ketsdever developed a fascination for astronomy, but the high-profile disintegration of the Space Shuttle Challenger in 1986 prompted him to recognize the need for more research to be done in the area of astronautics.

Seventy-three seconds into its flight, the Space Shuttle Challenger disintegrated. On board was Christa McAuliffe, the first member of NASA's "Teacher in Space Project."

"We were experiencing tragedy as a nation and I saw that they needed people to help solve problems," said Ketsdever.

After graduating high school, he was accepted into the aerospace engineering department at the University of Southern California, where he later earned his Ph.D.

For over two decades, Dr. Ketsdever has worked in the areas of advanced propulsion design and testing, rarefied gas dynamics, microfluidics, micropropulsion and spacecraft-thruster interactions.

He has two patents, one in micropropulsion and the other in the use of carbon nanotubes and light flashes to ignite propellants.

He recently completed a visiting professorship in the department of astronautics at the United States Air Force Academy.

"The Academy was a fun and interesting place. I wrote several Rhodes Scholarship letters of recommendation there," said Ketsdever, who also served as the chairman of the education subcommittee at the American Institute of Aeronautics and Astronautics.

While he now provides the tools to further robotic and human exploration of our universe, Ketsdever once played a role in enhancing the entertainment industry.

As a student at the University of Southern California, he was awarded a grant from the Society of Motion Picture and Television Engineers. Ketsdever worked on a project that helped to better utilize high-tech movie lights. This experience allowed him to meet

and work with famed cinematographer Woody Omens, who has worked on such films as Eddie Murphy's "Coming to America."

"It is important to collaborate on different levels. It is great to have the opportunity to work with people who you would never normally have the opportunity to work with," said Ketsdever, who believes strongly in allowing undergrads and grad students hands-on experiences.

At the Exploration and Space Technology Lab, Ketsdever works side by side with students, introducing them to advanced research of technologies focusing on astronautics, aeronautics, terranautics, aquanautics and bionautics.

"We need people that can think beyond what they know, but so that their ideas are technically feasible," said Ketsdever. He believes the most successful engineers are a combination of what he calls "smart/creative."

Ketsdever advises students who wish to pursue a career in his field to "study math and science. All science is valuable from biology to physics for engineers. Think in terms of collaboration early in your career," said Ketsdever.

Ketsdever, along with students made the October 2008 cover of *Review of Scientific Instruments*, for their joint research on time-accurate mass flow measurements of solid fueled systems.

In the classroom and in the lab, seeing the moments of discovery on students' faces, when they grasp a concept and are able to connect some dots, is the most rewarding.

Ketsdever has been working on liquid droplet propulsion for nanosatellites.

"It is squirt guns for satellites," said Ketsdever, about the process in which a satellite thrusts a propellant to another satellite, developing a cyclical process where propellants are recycled and constantly exchanged back and forth.

Another concept that is in the infancy of development has to do with using beamed microwave energy to enhance the performance of launch vehicles.

"In the classroom and in the lab, seeing the moments of discovery on students' faces, when they grasp a concept and are able to connect some dots, is the most rewarding," said Ketsdever.

When not in the lab, Ketsdever enjoys "highpointing," a hobby where he journeys to the highest elevation of a state. So far, he has been to thirty out of the fifty states. Next on his list to conquer is Mount Hood in Oregon.

Ketsdever still has the yearning to travel even higher, perhaps outside the earth's atmosphere.

"I don't think that ever goes away," he said, when asked if he still had the desire to travel through space. These days he takes pride in the fact that the astronomic gadgets he creates allow him to indirectly venture into the solar system, while still having his feet planted firmly on the ground.

Over the years, Ketsdever has been awarded many honors for his innovative work such as, 2006's American Institute of Aeronautics and Astronautics Engineer of the Year and 2002's Air Force Research Laboratory Scientist of the Year. He also was the United States Air Force Palace Knight Fellowship Recipient in the early nineties.

"It's obviously a great honor," said Ketsdever, when asked how it felt to receive such recognition. "However, I owe these things to the students whom I've mentored over the past several years. Without their hard work, none of this recognition would be possible. So, I really see the recognition as being recognition for the work we are doing, not for me personally."

This engineer, who once worked as a horse stagecoach driver at Knott's Berry Farm, America's first amusement park, never loses sight of the never-ending possibilities his field holds.

"It's pertinent to have the crazy ideas with knowledge behind them so that they can actually work," said Ketsdever, who gets great satisfaction out of "being able to give students a sense of discovery, a sense of exploration, and a sense of value."