NASA has chosen a planetary mission involving a team from the University of Arizona as one of two finalists to be the next robotic solar system explorer. The proposed mission, named CAESAR, for Comet Astrobiology Exploration Sample Return, seeks to return a sample from a comet to determine its origin and history.
UA Lunar and Planetary Laboratory professor Dante Lauretta is CAESAR’s mission sample scientist, responsible for leading the analysis of the returned comet sample. He also is tasked with advising on all aspects of the mission’s design that influence the scientific value and integrity of the sample. Lauretta is currently principal investigator of NASA’s OSIRIS-REx asteroid sample return mission, which launched in September 2016 and will return NASA’s first asteroid sample to Earth in 2023.

LPL associate professor Tom Zega is a co-investigator on the CAESAR mission and would analyze the comet sample material once it is back on Earth. Zega, currently a collaborator on the OSIRIS-REx mission, will be one of the first scientists to analyze samples from the asteroid Bennu.

"We are excited to bring the UA’s leadership in sample science innovation to the challenges posed by the CAESAR mission and its target comet," Lauretta said. "The work done on CAESAR will ensure that the UA continues to stand at the forefront of extraterrestrial sample analysis for the next 20 years."

If selected, CAESAR would be the fourth mission in NASA’s $1 billion New Frontiers program, which sends robotic spacecraft to conduct science-intensive planetary investigations. The UA leads the third New Frontiers mission, OSIRIS-REx, currently on its way to the asteroid Bennu to retrieve a sample of its surface for study on Earth.

"This is a wonderful opportunity to apply the experience that the UA has gained from OSIRIS-REx to another frontier in planetary science," said Kimberly Andrews Espy, UA senior vice president for research. "We are delighted to be able to continue the University’s tradition of leadership in exceptional NASA missions."

CAESAR’s target comet is 67P/Churyumov-Gerasimenko, which previously was explored by the European Space Agency’s Rosetta spacecraft. If the mission is ultimately chosen, the CAESAR spacecraft could launch by 2025 and return to Earth in 2038. The mission is led by Steve Squyres of Cornell University and managed by NASA’s Goddard Space Flight Center. NASA intends to make the final mission selection in summer 2019. Between now and then, the two finalist missions will receive funding from NASA to further advance the missions’ concepts and designs.

The other finalist mission, Dragonfly, is led by LPL alumna Elizabeth Turtle, who earned her Ph.D. in planetary science in 1998 and then continued at LPL as both a postdoctoral fellow and as research faculty before joining the Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. The Dragonfly spacecraft is a dronelike rotorcraft that would explore the prebiotic chemistry and habitability of dozens of sites on Saturn’s moon Titan, an ocean world in our solar system.

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