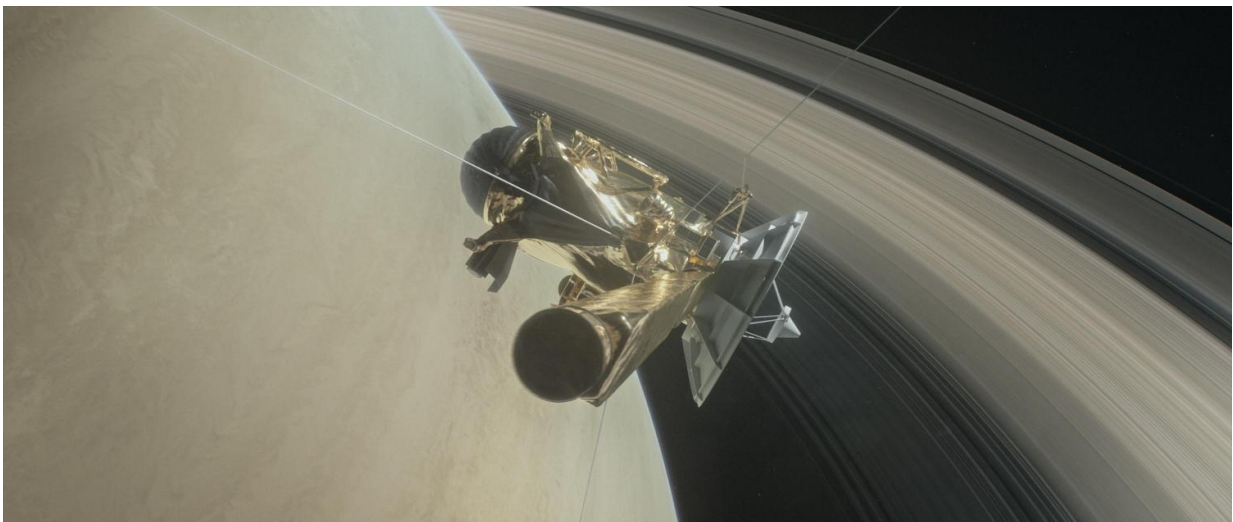


Scientists ready for Cassini mission to Saturn grand finale

September 13 2017



The Cassini spacecraft is making a series of final dives between the rings and the planet before it burns up in the atmosphere after 13 years of orbiting the Saturn system. Credit: NASA

University of Colorado Boulder Professor Larry Esposito has been eying the fabulous rings of Saturn for much of his career, beginning as a team scientist on NASA's Pioneer 11 mission when he discovered the planet's faint F ring in 1979.

He followed that up with observations of Jupiter's and Saturn's rings from the Voyager and Galileo spacecraft, which carried instruments

designed and built at CU Boulder. Now, as the principal investigator on CU Boulder's \$12 million Ultraviolet Imaging Spectrograph (UVIS) on the Cassini-Huygens [mission](#) to Saturn, Esposito and his Cassini colleagues are feeling a bit somber: The spacecraft has run out of fuel and will disintegrate in Saturn's dense atmosphere early on the morning of Sept. 15.

"We are still making discoveries about the Saturn system studying the Cassini data, and we expect to be making them for some time," said Esposito of CU Boulder's Laboratory for Atmospheric and Space Physics (LASP). "But September 15th will be a bittersweet ending to a mission that has fascinated us as scientists and enthralled the public with images and new findings for many years."

The UVIS instrument suite, a set of telescopes used to measure ultraviolet light from the Saturn system, has been used to study the structure and evolution of Saturn's rings; the chemistry, clouds and energy balance of Saturn and Titan; and the surfaces and atmospheres of some of Saturn's 62 known moons, said Esposito.

Launched in 1997 and pulling up at Saturn in 2004 for the first of hundreds of orbits through the planet's system, the mission has fostered scores of dazzling discoveries. These include in-depth studies that date and even weigh the astonishing rings; the discovery of methane lakes on the icy moon Titan; water plumes found squirting from the moon Enceladus; and close-up views of the bright auroras at the planet's poles.

One of Esposito's favorite discoveries using UVIS was the detection of a huge cloud of neutral oxygen atoms in the Saturn system on approach in 2003, which puzzled scientists for years. Subsequent research by the Cassini team indicated the oxygen atoms were coming from a salty, subterranean ocean on Enceladus, which scientists think may have conditions favorable for primitive life.

Many discoveries by Esposito and his UVIS team involve Saturn's rings—made up of ice, rocks and moonlets as large as Mount Everest—the age of which have been debated for decades. Esposito, who used observations from the Voyager mission to compare the rings of Saturn, Jupiter and Neptune, believes Saturn's rings may be as old as the solar system, which is believed to have formed some 4.6 billion years ago.

"When the two Voyager spacecraft passed by Saturn in 1980 and 1981, we thought the rings were relatively young," Esposito said. "But data from Cassini are consistent with the picture that Saturn has had rings throughout its history.

"We see extensive, rapid recycling of ring material in which moons are continually shattered into [ring](#) particles, which then gather and reform moons."

Other UVIS team members from CU Boulder include Ian Stewart, George Lawrence, William McClintock, Alain Jouchoux, Greg Holsclaw, Emilie Royer, Anya Portyankina and Michael Aye.

Esposito likened the ever-changing rings at Saturn to construction in Beijing, China, where marble from structures erected during the Ming Dynasty (1368—1644) is being recycled to build new structures today. "The same sort of thing is happening with Saturn's rings," Esposito said.

"They are renewed continually, so the rings themselves can be ancient, but the structures we see today are just part of their current manifestation. We have even watched the rings changing over the course of this mission."

The UVIS instrument will be turned on during Cassini's final dive into Saturn's data and will be routing data to Earth until the mission is over,

said Esposito, one of many mission scientists who are gathered at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, for Cassini's grand finale.

Provided by University of Colorado at Boulder

Citation: Scientists ready for Cassini mission to Saturn grand finale (2017, September 13)
retrieved 24 April 2024 from
<https://phys.org/news/2017-09-scientists-ready-cassini-mission-saturn.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.