Dr. Kevin Grazier

Planetary Scientist

NASA Jet Propulsion Laboratory

Research Specialty: Large scale computational simulations of the Solar System

Comfortable with the following age ranges: all

Comfortable with the following audience sizes: all

Dr. Kevin Grazier is a planetary scientist at NASA's Jet Propulsion Laboratory (JPL). He did his doctoral research in planetary physics at UCLA, performing long-term large-scale computer simulations of early Solar System evolution. He started at JPL in 1995 as an academic part-time student, finishing his Ph.D. dissertation in 1997. At JPL, Dr. Grazier has written mission planning and analysis software that won JPL- and NASA-wide awards. He currently holds the duel titles of Investigation Scientist and Science Planning Engineer for the Cassini/Huygens Mission to Saturn and Titan. Dr. Grazier also continues research involving computer simulations of Solar System dynamics, evolution, and chaos with collaborators at UCLA, Los Alamos National Laboratory, Purdue University, and the University of Auckland.

In addition to his JPL duties, Dr. Grazier teaches classes in basic astronomy, planetary science, cosmology, and the search for extraterrestrial life at UCLA and Santa Monica College.

On a lighter note, Dr. Grazier also currently serves as the science advisor for the PBS educational animated series *The Zula Patrol*, and also for the SciFi Channel series *Battlestar Galactica.*

Presentation Overviews and AV Requirements:

Classroom Visits

Our Solar System **Grades K-6**
What do the planets look like, and what makes each planet special? We examine each planet in the Solar System, and answer some of these questions.

AV Requirements: LCD projector and projection screen

Destination: Mars **Grades: 3-12**
Ever since Giovanni Schiaperelli noted the "canali" on Mars, humans have been fascinated, almost obsessed, with the possibility of life on neighboring Mars. In the 1900s, H.G. Wells wrote of invading Martians in *War of the Worlds*. Now, in the late 20th Century, humans are

sending a flotilla of small spacecraft to the red planet as a possible prelude to human exploration. It's an ironic twist of fate that we *humans* are now the invaders.

AV Requirements: LCD projector and projection screen

Goldilocks and the Three Planets **Grades: 3-12**
Venus is nearly the same size as Earth, yet has a surface temperature of over 900° F, and an atmospheric pressure over 90 times that of our world. At the other extreme, smaller Mars has a frigid, tenuous atmosphere. When we talk about the formation of life, what factors led to Venus, Mars, and Earth being "too hot," "too cold," and "just right"?

AV Requirements: LCD projector and projection screen

Lord of the Rings: The Cassini/Huygens Mission to Saturn and Titan **Grades 4-12**
The Saturnian system—with its rings, icy satellites, and giant moon Titan—is arguably the richest scientific treasure chest in the solar system. Cassini, the most advanced spacecraft ever sent into deep space, rendezvoused with the ringed planet in July 2004, while the Huygens probe descended into the atmosphere of Titan. Dr. Kevin Grazier, Investigation Scientist on the Cassini/Huygens mission, will discuss the Saturn system in general, and discuss what questions we hope to answer now that Cassini has arrived.

AV Requirements: LCD projector and projection screen

<u>Family Science Night Presentations</u>

Water, Water Everywhere
In recent years, scientists have discovered that life is far more widespread on Earth than previously thought. For years students learned in high school and college biology classes that sunlight was the basis for the food chain, and necessary for all life on Earth. Science has discovered that this is not always true. It seems that what is essential for life is liquid water.

Our search for life in the solar system, then, starts with a search for liquid water—and it seems that there is more of that than we have previously believed as well.

AV Requirements: LCD projector, lavaliere microphone and projection screen

<u>Keynote and Featured Addresses</u>

Moment of Impact
Deep Impact and *Armageddon* us made aware that the Earth is forever a target for impacts from asteroids and comets. Just how real is the impact threat anyway? Dr. Grazier talks about the true possibility of a collision, and gives a blow-by-blow account of what happens in a major impact event.

AV Requirements: LCD projector and projection screen

Lord of the Rings: The Cassini/Huygens Mission to Saturn and Titan
The Saturnian system—with its rings, icy satellites, and giant moon Titan—is arguably the richest scientific treasure chest in the solar system. On June 30th 2004, the largest and most sophisticated spacecraft ever sent into deep space, the Cassini/Huygens probe, entered orbit around Saturn after nearly a seven-year journey. This was the first step of a planned four-year mission during which Cassini will explore Saturn, its rings, satellites, and magnetic environment, while the Huygens probe will make measurements of the satellite Titan while descending through its mysterious atmosphere.

Dr. Kevin Grazier, Imaging Science Subsystem Investigation Scientist, and Science Planning Engineer on Cassini, will discuss the Saturn system in general and provide an overview of the mission, science objectives, and some of the results of the mission to date.

AV Requirements: LCD projector and projection screen

The Science of Science Fiction
To say that science has influenced science fiction is obvious. What is not as obvious is how science fiction, in turn, influences science. By virtue of working on both a major planetary space probe (Cassini), and a popular science fiction television series (*Battlestar Galactica*), Dr. Grazier has a unique perspective. He discusses, and shares his insights on, this science/science fiction "feedback effect".

AV Requirements: LCD projector and projection screen

Where Have the Other Asteroid Belts Gone?
Between the orbits of Jupiter and Saturn are approximately 10,000 asteroids—chunks of rock and metal left over from the early days of planetary formation. Beyond the orbit of Neptune are tens of thousands of cometary bodies—chunks of ice and rock, also left over from the days of the early Solar System. Objects between the orbits of the giant planets are very scarce, however. Are there very dark objects between the outer planets that we can't yet see, or have these regions been preferentially cleared through dynamical evolution?

AV Requirements: LCD projector and projection screen

Dr. Kevin Grazier
Formal Bio

A native Detroiter, Kevin Grazier earned undergraduate degrees in computer science and physics from Purdue University and Oakland University respectively. After writing software for video games, then the auto industry, he returned to Purdue and earned an MS degree in physics. At UCLA he did his doctoral research in planetary physics, performing long-term large-scale computer simulations of early Solar System evolution. While at UCLA, he worked simultaneously at the RAND Corporation, processing Viking Mars imagery in support of the Mars Observer mission. Kevin started at JPL in 1995 as an academic part-time student, finishing his Ph.D. dissertation in 1997. Kevin's first JPL assignment was to write multi-mission planning and analysis software--software that won JPL- and NASA-wide awards. He came to the Cassini Mission as Science Planning Engineer in early 1998, and shortly thereafter assumed the additional role of Investigation Scientist for the Cassini Imaging Science Subsystem. He continues research involving computer simulations of Solar System dynamics and evolution with collaborators at UCLA, Los Alamos National Laboratory, Purdue University, the University of Auckland, and the Space Science Institute.

Dr. Grazier is active in teaching the public, in particular children, about science in general, and space in specific. He teaches classes in astronomy, cosmology, and the search for extraterrestrial life at UCLA and/or Santa Monica College depending on the term. He can also be found performing planetarium presentations at Los Angeles' landmark Griffith Observatory. Dr. Grazier also co-hosted the premiere episode of Discovery Channel's *Science Live! Kids' Edition*, as well as CNN's coverage of Cassini's Saturn Orbit Insertion. He also serves on a NASA panel that reviews educational products.

On a lighter note, Dr. Grazier also works in the Hollywood entertainment industry, and currently serves as the scientific consultant for the PBS educational animated television series *The Zula Patrol*, as well as the SciFi Channel series *Battlestar Galactica*. He has consulted on several books, movies, and documentaries.

In October 2001, Dr. Grazier was honored as the first-ever honorary Chairperson of Oakland University's "Week of Champions" (Homecoming) celebration.

In what passes for spare time, he enjoys working out, martial arts, and, SCUBA diving.