National Center
for Earth and Space Science Education

Universities Space Research Association

USRA

Visiting Researcher Profile

JOURNEY through the UNIVERSE

Dr. Kevin Grazier

Planetary Scientist
NASA Jet Propulsion Laboratory

Research Specialty: Large scale computational simulations of the Solar System

Bio

Kevin Grazier grew up in Sterling Heights, Michigan. He earned BS degrees in computer science and geology from Purdue University. After spending a year writing video games and then three years in the auto industry—while simultaneously earning another BS in physics at Oakland University—he returned to Purdue and earned an MS degree in physics. Kevin then moved on to UCLA to do 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 NASA's Mars Observer mission. Kevin started at JPL in 1995 as an academic part-time student, finishing his Ph.D. dissertation in 1997. His first JPL assignment was to write multi-mission planning and analysis software—software that won JPL- and NASA-wide awards. He came to NASA's Cassini Mission to Saturn as Science System 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, evolution, and chaos.

Dr. Grazier is active in teaching the public, in particular children, about science in general, and space in particular. Depending upon the term, he can be found teaching classes in planetary science, astronomy, cosmology, or the search for extraterrestrial life at UCLA or Cal State, Los Angeles. He can also be found performing planetarium presentations at LA's landmark Griffith Observatory.

Dr. Grazier also works in Hollywood. He has been featured in several documentaries, and currently serves as the scientific advisor for the PBS animated series *The Zula Patrol,* and the Sci-Fi Channel series *Eureka* and *Battlestar Galactica*. He has also recently served as author and editor for the books *The Science of Dune*, and *The Science of Michael Crichton*.

Examples of Classroom Presentations

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.

Mars Through the Ages **[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*. We explore how Mars has been perceived from times past to the present.

Destination: Mars **[Grades: 4-12]**
Since 1996 humans have been sending a flotilla of small spacecraft to the red planet to explore, and as a possible prelude to human exploration. More are on their way as well! After decades of Martian invader movies, it is an ironic twist of fate that we *humans* are now the invaders. We examine the current state of Mars exploration.

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"?

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. On July 1st 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. Since then Cassini has explored Saturn, its rings, satellites, and magnetic environment, while the Huygens probe made 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.

Examples of Family/Public Program Presentations

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.

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.

Lord of the Rings: The Cassini/Huygens Mission to Saturn and Titan

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The Science of Science Fiction

To say that science has influenced science fiction is obvious. Without science, science fiction is just… fiction. 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 two popular science fiction television series (*Battlestar Galactica* and *Eureka*), Dr. Grazier has a unique perspective. He discusses, and shares his insights on, this science/science fiction "feedback effect".