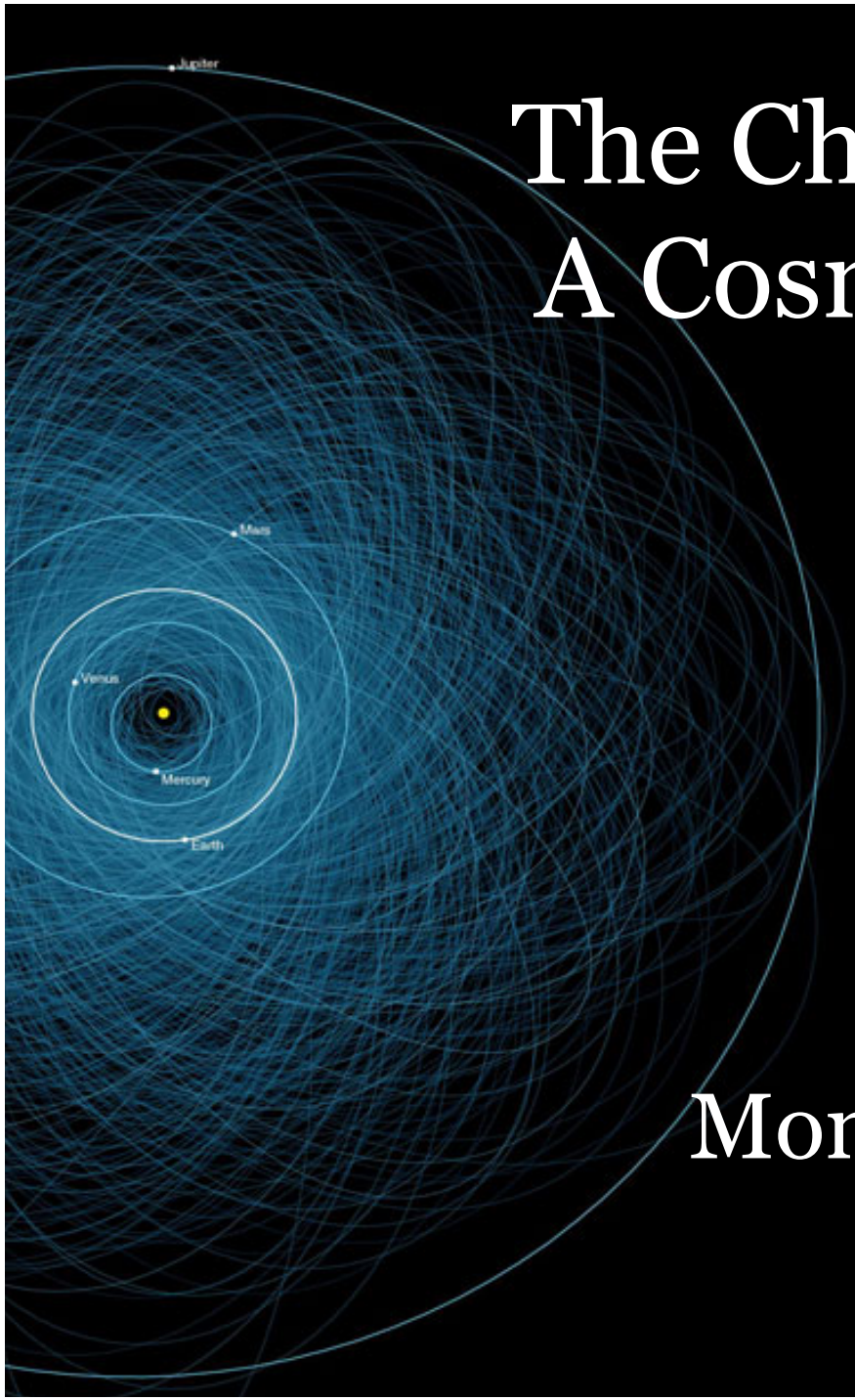

The Chelyabinsk Meteor: A Cosmic Wake-up Call?

The Inaugural F. K. Edmondson Astronomy Lecture

Dr. David Morrison

Director of the Carl Sagan Center for Study of Life in the Universe, at the SETI Institute, and Senior Scientist, NASA Ames Research Center

Monday, Oct. 14, 8:00 PM

Rawles Hall

David Morrison

Abstract:

What would happen if a large asteroid collided with the Earth? On February 15 of this year a rocky projectile entered the Earth's atmosphere above Russia traveling at more than 11 miles per second. It was about 65 feet in diameter, or half the diameter of the famous Tunguska impact of 1908, which flattened a thousand square miles of Siberian forest. Its terminal explosion, at an altitude of 14 mi, released energy of about half a megaton, equivalent to a couple dozen Hiroshima-sized atom bombs. About two minutes later, the shock wave reached the ground in Chelyabinsk Russia, breaking windows and injuring about 1500 people from flying glass. The Chelyabinsk impactor was smaller than most asteroids that have been detected by the telescopes of the NASA Spaceguard Survey, which focuses on finding asteroids of about 100m or larger. Since it approached the Earth from very near the direction of the Sun, it could not have been seen by any ground-based optical telescope of any size. It therefore struck without warning. Has this event served as a kind of wake-up call for planetary defense? NASA scientist David Morrison will speak to us about how we survey space to try to determine when Earth will be impacted by a large space object, and what we can do to protect our planet from a cosmic catastrophe.

Biography

David Morrison is Senior Scientist at NASA Ames Research Center, affiliated with the NASA SERVI (Solar System Exploration Research Virtual Institute, formerly the NASA Lunar Science Institute). He is also spending half time at the SETI Institute in Mountain View, California, where he is Director of the Carl Sagan Center for Study of Life in the Universe.

Dr. Morrison obtained his Ph.D. in astronomy from Harvard University, where he was one of the first graduate students to work with Carl Sagan. He is the author of more than 180 technical papers and has published a dozen books. He has been a science investigator on NASA's Mariner, Voyager, Galileo and Kepler space missions. Morrison is recipient of the Dryden Medal for research of the American Institute of Aeronautics and Astronautics, the Sagan Medal of the American Astronomical Society for public communication, and the Klumpke-Roberts award of the Astronomical Society of the Pacific for contributions to science education. He has received two NASA Outstanding Leadership medals and he was awarded the Presidential Meritorious Rank. Morrison was a founder of the multidisciplinary field of astrobiology and has played a leading role in the development of the NASA virtual research institutes.

David Morrison has held a variety of senior science management positions at NASA Headquarters in Washington and at Ames Research Center in California. In Washington he was the first Program Scientist for the Galileo mission to Jupiter, where he was responsible for defining the mission objectives and recommending the instruments and science investigations that were selected for this mission. At NASA Ames, he has been Chief of the Space Science Division, Director of Astrobiology and Space Research, and the founding Director of the NASA Lunar Science Institute.

Before coming to NASA, Morrison was an academic research scientist working in planetary science and space missions. He was Professor of Astronomy at the University of Hawaii, where he also directed the 3-meter NASA Infrared Telescope Facility of Mauna Kea Observatory and served for two years as University Vice Chancellor for Research. His research accomplishments include demonstration of the uniform high surface temperature of Venus, the discovery that Neptune has a large internal heat source while its "twin" planet Uranus does not, determination of the surface composition of Pluto (methane ice), first ground-based measurements of the heat flow from Jupiter's volcanic moon Io, discovery of the fundamental division of the asteroids into dark (primitive) and light (stony) classes, and the first quantitative estimate of the cosmic impact hazard. As a founder of the multidisciplinary field of astrobiology, Morrison was also co-chair of the first NASA Astrobiology Roadmap workshop and report. He has also made many contributions to teaching astronomy and space science, including authorship of leading college undergraduate texts in astronomy and planetary science, and he is a popular public writer and lecturer.

In 1991 Morrison chaired the NASA study of impact hazards that recommended that a Spaceguard Survey be carried out to search for potentially threatening asteroids and comets, and in 1995 he received the NASA Outstanding Leadership Medal for this work. He has testified four times before Congress on comets and asteroids, the impact hazard, and ways to mitigate it. He has served as Councilor of the American Astronomical Society, Chair of the Division for Planetary Science of the American Astronomical Society, President of the Astronomical Society of the Pacific, Chair of the Astronomy Section of the American Association for the Advancement of Science, and both President of Commission 16 (Planets and Satellites) and of the Working Group on Near Earth Objects of the International Astronomical Union.

The annual F. K. Edmondson Astronomy Public Lectures were established to honor the memory of Professor Frank Kelly Edmondson, a faculty member of the Department of Astronomy at Indiana University from 1937 until his retirement in 1983, and as Chair of the Department from 1944 until 1978. Professor Edmondson is remembered not only for his contributions to the study of asteroids through the Indiana Asteroid Program, but also for his dedication and service to Indiana University and to the astronomical community. The Edmondson Lectures are endowed in honor of Professor Edmondson by his family and friends.