

**Society for the Advancement of Materials and Process Engineering  
2009-2010 Technical and Social Event Series**

In cooperation with the following collaborating societies<sup>1</sup>  
ASME, ASM, and ...

**Global Catastrophes  
By Mark Boslough**

**DATE/TIME:** Saturday, December 5<sup>th</sup>. This is to be the major formal event for Christmas 2009 for the participating societies. Please come and bring a guest for this excellent technical and social event. Social time and Hors D'Ouevres are at 6:00PM, Meal at 6:45PM, Speaker at 7:15PM. Come early to visit with your colleagues.

**TOPIC:** Asteroids are assumed by impact specialists to exceed a “global catastrophe threshold” if they are more than about a mile across. A collision by such an object could alter the Earth’s climate, kill billions of people, and cause civilization to collapse. Only a small fraction of the casualties would be directly due to the impact. The blast wave, heat, falling debris, shaking, and tsunami would kill millions. The vast majority of deaths, however, would be slow and indirect: starvation, exposure, disease, or violence related to societal disruption. The concept of a catastrophe threshold comes from “nuclear winter” studies. The impact threat, at its core, is a climate-change threat.

There is geological evidence for such catastrophes in the ancient past, sometimes so severe that they have led to mass extinctions. Dinosaurs and many other organisms appear to have been wiped out 65 million years ago by a six-mile-wide asteroid. About 12,900 years ago, woolly mammoths and many other great beasts went extinct, and the Native American Clovis culture suddenly disappeared at the same time. Some scientists have speculated that a comet exploded over the Canadian ice sheet, causing a climate change so abrupt and severe that these humans and animals could not adapt. However, spontaneous global changes of this speed and magnitude occur much more often than impacts. Scientists are just beginning to see the patterns of past catastrophes and are working to unravel the reasons.

What are the odds of a global catastrophe in our lifetimes, or those of our children? The probability of such an event happening in the near future may be small, but it is not zero. Humans have the technology to prevent some, but not all potential catastrophes. We must accept the very real possibility that the world as we know it could come to an end in our own lifetimes.



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<sup>1</sup> ASME: Amer. Soc. of Mechanical Engineers, ASM: American Society for Materials, SAME: Soc. of Amer. Military Engineers, ACerS: Amer. Ceramic Soc., AIChE: Amer. Inst. Chemical Engineers

**SPEAKER: Mark Boslough** is a physicist who has been concerned about the planet's future for most of his life. When he was a teenager vacationing at the Tetons, a blindingly bright object streaked across the sky. It became known as the Great Daylight 1972 Fireball, and was the first such event ever recorded by DoD sensors. It was a small asteroid, but it could have released kilotons of energy in a giant explosion if it had hit the Earth. During the cold war, Mark worried about such an Armageddon from space.

Mark's interest led him to experimental impact physics research as a graduate student at Caltech under Tom Ahrens. He learned about planetary cratering and visited Arizona's Meteor Crater with impact pioneer Gene Shoemaker, at about the same time Louis Alvarez visited Caltech to present his team's evidence that the dinosaurs had been wiped out by an asteroid impact. As an experimentalist Mark developed methods to study laboratory-shocked minerals by measuring their high temperatures and collecting released gases, showing how ancient impacts could have melted rocks and changed the composition of the atmosphere.

Dr. Boslough joined Sandia Labs in 1983, working on many aspects of impact physics including NMR spectroscopy of shocked sandstone, testing space-station debris shields, and analyzing satellite observations of fireballs. In 1994 he was a member of a team that gained international recognition for using a supercomputer to correctly predict the effects of the impact of Comet Shoemaker-Levy 9 on Jupiter. His current impact research is focused on computational modeling of low altitude airbursts and their effects. His work has been the subject of several television documentaries in which he joined expeditions to airburst sites in the Sahara Desert and in remote Siberia. This year, he appeared in a PBS/Nova documentary about the impact hypothesis for the extinction of the woolly mammoth. An upcoming documentary will highlight his role in understanding Asteroid 2008 TC<sub>3</sub>, its explosion over Sudan, and the recovery of its meteorites.

**MENU:** The dinner cost includes warm rolls & butter, mixed greens Coffee, Iced Tea & Water. The salad is Field Greens with Raspberry Vinaigrette and the side is Potatoes Au Gratin. There is a choice of three entrées: (1) Grilled Chicken Breast in a sauce of Champagne, Artichoke Heart, & Mushrooms, and (2) Sliced Sirloin of Beef. The vegetarian alternative entrée is (3) Grilled Vegetable Napoleon, or Grilled Eggplant, Red Pepper, Squash, and Portobello Mushroom, with Tomato Coulis. Dessert is from a selection of NY Cheesecake, Chocolate Cake or Chef's Special. A cash bar is available.

**PLACE:** Tanoan Country Clubhouse, 1801 Academy Road NE. Just tell the guard at the Gate House that you are attending the Mayor's talk and drive to the Clubhouse circle at the end and park. The second floor is **handicap accessible** via a driveway ramp on the right end of the Clubhouse.

**COST:** \$45/person inclusive of all taxes and gratuities.

**RSVP:** Please register before November 7<sup>th</sup> at <http://www.acteva.com/booking.cfm?bevaid=192818> or with Wally McClellan at 505-350-4095, [wmm4747@yahoo.com](mailto:wmm4747@yahoo.com).