Glen R. Cass
1947 – 2001

Glen R. Cass, professor of environmental engineering and mechanical engineering, died of cancer July 30. He was 54.

Cass received his BS from the University of Southern California in 1969 and his MS from Stanford in 1970. After earning his PhD from Caltech in 1978, he stayed on and taught at the Institute for 24 years. In January 2000, he joined the faculty of the Georgia Institute of Technology as professor and chair of the earth and atmospheric sciences department. He maintained a joint appointment with Caltech.

A prolific scientist with more than 200 published articles, conference proceedings, book chapters, and technical reports to his credit, Cass focused on air pollution, with a particular emphasis on the control of airborne particles, photochemical oxidants, and improved visibility. He was instrumental in identifying the complex mix of airborne chemicals that pollute urban areas such as Los Angeles and the northeastern United States. Of special concern were very fine particles that can be inhaled and stay in the lungs, and that contribute to haze and poor visibility.

Cass initiated a global ozone study at 500 sites around the world in 1999, which continues today. His research group takes airborne particle measurements in many parts of the world. Seven sites in mainland China were monitored for "Operation Blue Sky," which identified pollution sources in Beijing and other cities, and whose results factored into China's 2008 Olympic bid.

He was also interested in the protection of museum collections and archaeological sites from damage due to air pollution. He and his colleagues modeled air quality both within and just outside several museums throughout Southern California, including the new Getty Center in Los Angeles, which was useful in evaluating the effectiveness of various measures to protect works of art.

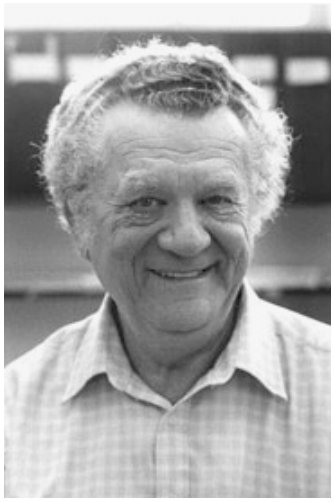
In China, Cass helped design computer-based models that simulated the air flow into the Yungang Grottoes, a collection of man-made cave temples dating from the fifth century A.D., which hold more than 50,000 stone carvings, now deteriorating due to pollution from nearby coal mines. Cass's work contributed to the design of particle filtration systems and ventilation rates for the grottoes.

And in Poland, his work helped save the salt sculptures in the huge Wieliczka salt mine. Miners had decorated the mine with their carved statues over centuries, but in the last century some of the earliest ones had melted into featureless blobs. He contributed to the finding that lowering the relative humidity would halt further deterioration.

Cass is survived by his wife, Jeanie, and son, Rob. A memorial service on campus is planned for January. □

—JP

Samuel Epstein
1919 – 2001



Samuel Epstein, the William E. Leonhard Professor of Geochemistry, Emeritus, died September 17 at the age of 81.

Born near Kobryn, Poland (now Belarus), Epstein emigrated as a child with his family to Canada. He earned his BSc (1941) and MSc (1942) from the University of Manitoba and received his PhD in chemistry from McGill University in 1944.

After working on rare gas fission products for the Canadian Atomic Energy Project, in 1947 he joined Nobel laureate Harold Urey on the oxygen isotope paleotemperature project at the University of Chicago. With-

in several years Epstein and his team made what is widely regarded as the most significant scientific contribution in the history of stable isotope geochemistry: they measured the temperature coefficient of the oxygen isotope exchange reaction between $CaCO_3$ and H_2O and developed astonishingly precise methods to measure oxygen isotope ratios of marine carbonate fossils. This allowed them to calculate the temperatures of the ancient oceans more than 70 million years ago.

In 1952, when Harrison Brown left Chicago to start the geochemistry program at Caltech, he invited Epstein to join him. Over the succeeding years at Caltech, Epstein explored a variety of uncharted scientific terrains, welcoming the prospect of applying the newly developed techniques and principles of stable isotope chemistry to almost every aspect of natural science. He applied oxygen, carbon, hydrogen, and silicon isotope studies to problems of botany, plant and animal physiology, photosynthesis, biochemistry, meteorology, Pleistocene climatology, glaciology, and ore deposits. He wrote many papers on igneous, metamorphic, and sedimentary petrology and carried out important research on the Antarctic and Greenland ice sheets, on isotope geothermometry, on modern geothermal systems, and on the origin of meteorites, tektites, and lunar rocks and minerals.

Epstein was a recipient of the Goldschmidt Medal of the Geochemical Society in 1977, the Day Medal of the Geological Society of America in 1976, the Wollaston Medal of the Geological Society of London in 1977, and the Urey Medal of the European Association of Geochemistry in 1995. In 1976, he was elected to both the National Academy of Sciences and the American Academy of Arts and Sciences, and in 1997, he was elected a fellow of the Royal Society of Canada.

Epstein retired from teaching in 1990, but up until a few months ago, he continued to work full time in the lab every day. He is survived by his wife, Diane, two sons, Reuben and Albert, and three grandchildren. A memorial service will be held sometime in the coming months. □ —*RT*

Honors and Awards

David Baltimore, president of Caltech, has been named a 6th Annual Eddy Award winner for both his and Caltech's "contributions in bringing the fields of education, research and professional employment together" in the Los Angeles County area. He will receive the honor on November 14 from the Los Angeles County Economic Development Corporation, at a dinner and awards program at the Beverly Hilton Hotel.

Kaushik Bhattacharya, professor of applied mechanics and mechanical engineering, and Hideo Mabuchi, associate professor of physics, were both selected to participate in the National Academy of Engineering's seventh annual Frontiers of Engineering Symposium, held September 13–15 at the National Academies' Arnold and Mabel Beckman Center in Irvine, California. "The program brings together outstanding engineers (ages 30–45) from industry, academia, and government to discuss pioneering technical work and leading-edge research in various engineering fields and industry sectors." This symposium featured topics in the areas of aeronautics and aerospace, civil systems, wireless communications, and technology and the human body.

The 2001 ASCIT (Associated Students of Caltech) Teaching Awards have gone to Oscar Bruno, professor of applied and computational mathematics, Dirk Hundertmark, Taussky-Todd Instructor in Mathematics, Edward McCaffery, visiting professor of law, Thomas Neenan, lecturer in music, and Charles Peck, professor of physics. At the same time, George Cheron, lecturer in Russian, and Glen George, lecturer in computer science and electrical engineering, have been honored with ASCIT Lifetime Achievement Awards.

Emmanuel Candes, assistant professor of applied and computational mathematics, has been selected to receive an Alfred P. Sloan Research Fellowship, which carries with it a grant to be used in a flexible and largely unrestricted manner. Sloan recipients are selected on an extraordinarily competitive basis from a group of nominees representing the very best of young scientists.

David Chan, assistant professor of biology and Bren Scholar, has been named a Rita Allen Foundation Scholar. The award carries a $50,000 stipend for up to three years. A graduate of Harvard Medical School and MIT, Chan joined Caltech in