

Kim C. Benjamin 1954-2013



Kim C. Benjamin, a Fellow of the Acoustical Society of America, passed away at his home on Tuesday, 05 May 2013 after a 23 month illness. Mr. Benjamin was born in Providence, Rhode Island on 21 October 1954. In 1974 he received his A.S. degree in Physics from Rhode Island Junior College

and, in 1977, the B.S. degree in Physics from the University of Rhode Island. Kim completed his M.S. degree in Ocean Engineering in 1980 at the University of Rhode Island with Professor Peter R. Stepanishen as his Advisor.

Mr. Benjamin's M. S. thesis, "Forward and Backward Projection of Acoustic Fields using FFT Methods," provided groundbreaking understanding of the interaction and interpretation of how acoustic waves can be transposed. Portions of this work were presented at the 97th Meeting of the ASA in Boston in June 1979 and at the 101st Meeting of the ASA in Ottawa in May 1981. The subject of the second presentation was published in JASA in April 1982. Kim had over 50 conference presentations and 20 publications during his career.

From 1981 to 1995 (with a 7 month absence at Woods Hole Oceanographic Institute in 1985), Kim was an Acoustic Design Engineer at Raytheon Company's Submarine Signal Division in Portsmouth, RI where he specialized in the design and development of underwater acoustic transducers. Mr. Benjamin enjoyed a reputation early in his career for developing new acoustic transduction materials from laboratory curiosities into advanced transduction devices. One of the first materials he investigated was magneto-strictive metallic glassy ribbon for use as a gradient hydrophone. This was later followed with experimental efforts to evaluate material parameter coefficients for glass reinforced composite flex-tensional transduction shells and transduction properties for length expander magneto-strictive rods. For the remainder of his Raytheon career (1985-1995), key efforts by Kim include: the development of a very large, 2D, ultrasonic imaging array; design and develop-

ment of a toroidal volume search sonar (TVSS); development multi-layered, broadband copolymer for acoustic transmit applications; and production support for numerous U.S. Navy fleet transducers. In 1990, Mr. Benjamin worked jointly with The Pennsylvania State University in fabricating the first 1-3 piezo-composite transduction prototypes used for acoustic transmission applications. This early effort would later become the focus for much of Mr. Benjamin's career when he joined the Naval Sea Systems Command Division Newport in November 1995.

Throughout his Navy civilian career, Mr. Benjamin focused primarily on advancing 1-3 piezocomposite materials into unique underwater acoustic devices. Among his key accomplishments are the following: design and fabrication of 1-3 piezocomposite-based beam steered parametric mode transducers with integral high-gain receivers; design and delivery of parametric mode sub-bottom profiler transducers; development of U. S. Navy calibration transducer standards F82 and F83; use of 1-3 piezo-composites materials with area-shaded electroding to realize a new class of transduction which maintains a constant beam-width over a two octave bandwidth; novel use of singly and double curved piezo-composites for applications in ultrasonics and structural receivers; design and segment demonstration of a cylindrical array module that is coupled linearly to form a towed line array with 3D spatial discrimination; design and fabrication of a 120 element conical octahedral homing array for high speed (> 150 knots) applications; design and development of wideband piezo-composite-based transducers for acoustically tracking high speed underwater projectiles traveling near the speed of sound of water; design of all tooling used for the development of a singly curved array of cymbal panels for low profile, low frequency transduction application. Kim has been granted eight U.S. patents and has another seven patent disclosures currently under consideration at the United States Patent Office.

Mr. Benjamin was active in the Acoustical Society of America beginning with his first presentation in 1979 and continued with numerous presentations and publications throughout his career. He was the former Chair of the ASA Engineering Acoustics Technical Committee (2003-2006) and long term member of the ASA Medal and Awards Committee (2006-2013).

Kim enjoyed sailing and spending time at his vacation home in the woods of Tamworth, New Hampshire. He is survived by his wife Pamela.

– Thomas R. Howarth

Stephen H. Crandall 1920-2013



Stephen H. Crandall, a Fellow of the Acoustical Society of America and a former recipient (1978) of the Society's Trent-Crede Medal passed away on 29 October 2013 in Needham, Massachusetts. He was 92 years old.

Crandall was born in Cebu, in the Philippine Islands, on December 2, 1920. He began undergraduate studies

at Stevens Institute of Technology in 1936. A note written by Crandall many years later reveals the personal difficulties he experienced during his undergraduate years.

"I have enjoyed better than average health over the last 50 years, but I was not so lucky when I was a student at Stevens. Because of a spinal infection, I spent more time in hospitals than I did in classrooms. I entered Stevens with the class of '40, then slipped back to the class of '41, and eventually graduated with the class of '42. Although my attendance in classes was spotty, I did well academically. In those days I was a quick study."

It is quite likely that, by the time Crandall graduated from Stevens, his self-study activities had given him a superb graduate level grounding in the mathematics related to engineering. He graduated with a B.S. in Mechanical Engineering from Stevens in 1942, shortly after the U. S.'s entry into World War II. He found employment as a staff member of the Radiation Laboratory of MIT and was able to pursue a doctorate while working at the Radiation Laboratory, receiving a Ph. D. in mathematics in 1946. Shortly thereafter, he joined the Mechanical Engineering faculty at MIT. He was appointed Assistant Professor in 1947, Associate Professor in 1951, Professor in 1958, and was named Ford Professor of Engineering in 1975. He retired from MIT in 1991 with the title of Ford Professor Emeritus, but continued to teach through 2002.

Across MIT and by his former students and colleagues, scattered all over the world (many of whom are active in this Society), Crandall is remembered as an outstanding teacher and

scholar, noted for the clarity of his lectures: He spoke slowly, but managed to cover plenty of material. While at MIT, he led the transformation of mechanics into an engineering science, acting as editor of three groundbreaking texts: *Random Vibration* (1958), *An Introduction to the Mechanics of Solids* (1959), and *Dynamics of Mechanical and Electromechanical Systems* (1968). Crandall was a pioneer of random vibrations research, offering the first academic course on the subject in 1958. He co-founded, with the late Patrick Leehey, the interdepartmental Acoustics and Vibration Laboratory at MIT in the mid 1960's and subsequently directed that laboratory for 33 years. This laboratory served as the interdepartmental focal point for research and education in acoustics at MIT and attracted a long sequence of students and post-graduate scholars. Crandall published a total of eight books and 160 technical papers.

In the same note mentioned above that was written somewhat late in his life, Crandall reminisced-

"I was fortunate to start my teaching career during World War II. The past half-century has been an exceptional period in American history. Until quite recently it has been a time of continually expanding horizons. In engineering education we made revolutionary changes as we moved to a stronger engineering science curriculum. As an enthusiastic proponent of this movement I had the benefit of working with exceptionally able students in the classroom and the laboratory."

Crandall was active in many technical societies. He served as chairman of the Executive Committee of the Applied Mechanics Division and as vice president of Basic Engineering for the American Society of Mechanical Engineers (ASME); he also served as president of the American Academy of Mechanics. He served as chairman of the U.S. National Committee for Theoretical and Applied Mechanics and of the Solid Mechanics Panel of the International Union of Theoretical and Applied Mechanics. He was also a member of the Board of the International Commission for Acoustics.

Crandall's professional contributions have been widely recognized. He was elected to the American Academy of Arts and Sciences, the National Academy of Sciences, the National Academy of Engineering, and the Russian Academy of Engineering.

The Acoustical Society of America awarded him the Trent-Crede Medal in 1978, and the American Society of Civil Engineers awarded him both the Theodore von Karman Medal,

Passings

in 1984, and the Freudenthal Medal, in 1996. The ASME awarded Crandall the Worcester Reed Warner Medal in 1971; the Timoshenko Medal in 1990; the Den Hartog Award in 1991; and the Thomas K. Caughey Dynamics Award in 2009. He was inducted as an honorary ASME member in 1988.

In addition to his eminent research activities, Crandall was a strong proponent of international collegiality. Both Crandall and his wife, Pat, had strong interest in the teaching and supporting of foreign students. This interest was partly initiated by their first sabbatical at Imperial College London in 1949 and reinforced by subsequent sabbaticals and lecture tours in Mexico, France, Germany, Israel, Russia, China, Japan, Aus-

tralia, and South Korea. Crandall learned to speak Spanish, French, and Russian, and enjoyed giving lectures in the local language. Pat chaired MIT's faculty wives committee, which organized English-language classes for the wives of foreign students. She also enjoyed playing Dixieland piano and was a member of the Tabor Hill Jazz Band for several decades, hosting their rehearsals at their home on Tabor Hill Road in Lincoln, Massachusetts.

Crandall's wife Pat, his close companion for 62 years, died in 2011. He is survived by his daughter, Jane (Crandall) Kontrimas, her husband Peter, and son Stephen; and by his son, William B. Crandall.
— *Allan D. Pierce*

William C. Cummings

1932-2013



William C. Cummings, a Fellow of the Acoustical Society of America, passed away on August 20, 2013 at the age of 81. Dr. Cummings was a principal participant in the actions that led to the formation of the ASA's Animal Bioacoustics Technical Committee in 1997. This Technical Committee began as a Technical Specialty Group,

and Cummings served as the Group's founding chair from 1988 to 1994. He was also a former vice president and president of the San Diego ASA Regional Chapter. He served on the ASA coordinating committee on environmental acoustics (an ad hoc committee) and organized various special sessions at ASA meetings, especially during the formative years of the Technical Specialty Group. Cummings is widely-recognized in the animal bioacoustics community for his work concerned with the sounds of whales. He frequently presented papers at ASA meetings, including papers in honorary sessions to commemorate former colleagues D. V. Holliday, Robert Gales, and P. O. Thompson. Cummings coauthored several papers with both Holliday and Thompson. For example, Holliday was a coauthor with Cummings on a paper, "Passive acoustic location of bowhead whales in a population census off Point Barrow, Alaska," published in JASA in 1985. Thompson was

a coauthor with Cummings of a paper "Underwater sounds of migrating gray whales, *Eschrichtius Glaucus* (Cope)," published in JASA in 1968.

A special session in Cummings honor was part of the 140th ASA meeting in Newport Beach, CA on 3-8 December, 2000. Throughout his 50 years of active membership in the ASA, Bill strived to provide a more accommodating environment for young professionals within the organization, while serving as a mentor to young colleagues and graduate students.

Dr. Cummings received his B. S. in biology and chemistry from Bates College, Lewiston, Maine, in 1954. He served in the U.S. Army from 1954-1956 and then went on to his graduate studies at the University of Miami, Florida, where he earned his M.S. in 1958 and his Ph. D in 1967. As a dedicated biological oceanographer and bioacoustician, Bill conducted research on marine invertebrates, fishes, and mammals throughout ocean basins around the globe. During his graduate work at the University of Miami, Bill studied the reproductive biology of fishes and shrimp along the Western Atlantic and Caribbean. He also investigated near-shore and salt pond ecology while at the University of Rhode Island before initiating work on ambient noise and acoustic propagation across Florida Strait. Bill then teamed up with John Steinberg, among others, to install and operate a hydrophone array off the Bahamas where he operated an innovative acoustic-video station from 1959-1965. While working on the long-term monitoring project in Bimini, Bill met Robert Gales (a former ASA President). Gales invited Bill to give a lecture on his work at the Naval Undersea Center in San

Diego. Soon, Bill was offered a job working as an oceanographer for the Naval Electronics Laboratory on Point Loma in San Diego. Working at the Navy laboratory, Bill was among the earliest to describe the calls of blue whales, gray whales, right whales, Bryde's whales, and finback whales. Much of this work was published in JASA. Bill served as chief scientist for expeditions aboard the 95-foot sailing yawl Saluda, an especially quiet platform for recording bioacoustics. In 1969, Bill made dives in the submersible Deep Star with Dr. Richard Rosenblatt of Scripps Institution of Oceanography. The purpose of these dives was to prepare for bottom acoustic monitoring of marine life for the SEA-LAB III site off San Clemente Island, California. At Point Loma, Bill advanced to head of the Applied Bioacoustics Branch at the Naval Ocean Systems Center where he conducted numerous projects throughout the Pacific from 1967-1977.

In 1977, Bill moved on to become chief curator for the San Diego Natural History Museum where he supervised 26 research scientists and expanded research activities for all scientific departments at the museum. Bill led research voyages to remote locations from Chile to the Arctic Circle in the Pacific, the North and South Atlantic Ocean, and throughout the Caribbean, Scotia, Weddell, Bering, Chukchi, Beaufort, Okhotsk, Philippine, East China, and Japan seas. Bill participated in 36 oceanographic cruises, was awarded four U.S. patents for the design and development of underwater acoustic communication devices, and published more than 75 scientific papers. Overall, Bill's work filled numerous data gaps in the field of bioacoustics and aided in the conservation of marine resources.

Bill continued his work through various setbacks including the death of his beloved wife Joan from cancer in 1994 and injuries from a later hunting accident which left 50 shotgun pellets from another's gun deeply imbedded throughout his body. Bill remained active as an ASA member at large and within the San Diego community throughout his later life. He enjoyed photography, sailing, woodworking, exploring his family genealogy, and especially fishing with friends. He regaled his friends and family with stories of previous expeditions, associates and adventures, interspersed with a hearty belly laugh that could only make one smile. Bill's life and stories are carried on by his brother Bob, two sons Phillip and Mark, daughter-in-law Theresa, and five grandchildren and great-grandchildren. — *Scott Aalbers and Sam H. Ridgway*

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