

## Obituary Notice

*Pioneer in Ocean Technology: Fred N. Spiess Scripps Institution of Oceanography, UC San Diego*

September 12, 2006

Fred Noel Spiess, a world-renowned deep-sea ocean explorer and inventor at Scripps Institution of Oceanography, University of California, San Diego, died Friday, Sept. 8, 2006, in UC San Diego's Thornton Hospital in La Jolla, Calif. The cause of death was cancer. Born in Oakland, Calif. on Christmas Day, 1919, he was 86 years old.

Spiess had been affiliated with Scripps Oceanography since 1952. He was a professor emeritus of oceanography in the Marine Physical Laboratory (MPL) at Scripps and had a long and successful scientific career that spanned more than 50 years.

Spiess was widely known for his contributions to the development of innovative ocean technology. He was tireless in defining new ways to look at the deep ocean and seafloor. He designed and built instruments, took them to sea for deployment and led numerous expeditions to investigate the deepest parts of the world's oceans. He was co-inventor of the one-of-a-kind FLIP, the Floating Instrument Platform.

"We are deeply saddened to hear of Fred Spiess's passing," said Marye Anne Fox, chancellor of UC San Diego. "Fred was a brilliant innovator in ocean science who dedicated decades of enthusiastic leadership to the development of UC San Diego and to the University of California. Through his participation on numerous committees over the years, he has helped UC San Diego become a national academic and scientific leader. Today, our hearts go out to his family as we mourn his loss and express our deep appreciation for his devoted years of service."

"Fred Spiess was the embodiment of an oceanography pioneer and his influence in marine science will be remembered forever," said Charles Kennel, director of Scripps Oceanography. "On the Scripps campus he will be celebrated as someone who made the type of pivotal contributions that made this institution a world leader in its first 100 years. Everyone at Scripps will miss his academic eminence, his personal integrity and his friendly demeanor and smiling face."

Spiess received his A.B. degree in physics from UC Berkeley in 1941, and received a U.S. Navy commission at the same time. During World War II he completed 13 war patrols in submarines in the Pacific Ocean and won the Silver Star and Bronze Star. He held the rank of captain (retired) in the U.S. Naval Reserve until his death.

After the war, Spiess attended Harvard University, receiving his M.S. degree in communication engineering in 1946. He then returned to UC Berkeley for graduate study in physics, where he conducted research under Emilio Segré in the area of short-lived alpha decay problems and high-energy particle scattering and absorption.

He completed his Ph.D. degree in 1951, then worked briefly for General Electric's Knolls Atomic Power Laboratory in Schenectady, NY. In 1952 he joined the Marine Physical Laboratory (MPL) at Scripps and was director of MPL from 1958 to 1980.

He spent the year 1962-63 as acting director of Scripps and was director for the academic year 1964-65, following Roger Revelle's resignation and preceding the appointment of William A. Nierenberg. He was then an associate director of Scripps until 1980. He also served as chairman of the Scripps Graduate Department in 1963-64 and 1976-77. During 1974-75, while on leave from Scripps, he was a scientific liaison officer for the Office of Naval Research in London.

From 1980 to 1988 he was director of UC's Institute of Marine Resources (IMR), headquartered at UC San Diego, retaining his faculty association with Scripps and continuing his research in MPL. As director of IMR, the university's only statewide marine science unit, Spiess coordinated a diversity of research interests at the interdisciplinary institute concerned with research, education and public service in relation to society's uses of the resources of the sea.

Spiess was the co-designer, along with Fred Fisher and Phillip Rudnick, of FLIP, a 355-foot long, non-propelled research vessel. This unique research craft "flips" from a horizontal to a vertical position to form a steady platform for research at sea. In 2002, FLIP marked 40 years in active service at Scripps. At the time of his death, Spiess was involved in arranging for the use of FLIP as a testing and demonstration platform for research and engineering systems to be deployed in ORION (Ocean Research Interactive Observatory Networks), a new ocean observations program.

Spiess was a seagoing scientist, leading an average of two expeditions a year for more than 40 years. His research interests included studies of long-range propagation of sound and related underwater communication systems, ocean-going stable platforms and deep-towed instrument systems, fine-scale properties of the deep seafloor, phenomena associated with plate tectonics and seafloor spreading and seafloor geodesy.

In 1989 he led the development of a wireline re-entry system to carry research instruments from the deck of a ship through 5,000 meters of seawater and into seafloor boreholes previously drilled as part of deep-sea scientific drilling programs. He conducted the first, highly successful use of the system off Florida during a cruise of the Scripps research vessel Melville. He continued to lead the refinement and use of this capability, with a 2001 expedition on R/V Revelle making the first wireline installation of thermistor strings in drill holes to study the circulation of fluids in the earth's crust.

Spiess was principal investigator for several programs at the East Pacific Rise (EPR) and the Mid-Atlantic Ridge. He led an international expedition to the EPR at 21 degrees north in 1979, when hot springs, oases of unusual marine life and rare mineral sulfide deposits were discovered at depths of 2,600 meters.

Spiess worked on the development of seafloor search technology and in 1971 led a successful deep-sea expedition that located and mapped the wreckage of five ships previously scuttled by the U.S. Navy. He also carried out National Science Foundation-supported manganese nodule surveys, Navy-sponsored studies of the acoustic properties of the deep seafloor and a variety of geological and geophysical expeditions in the Pacific, Atlantic and Mediterranean oceans. He pioneered the development of seafloor geodesy, developing and proving techniques for measuring positions on the deep seafloor with centimeter repeatability.

Spiess wrote numerous technical articles on subjects in marine physics and ocean engineering. He served on a variety of advisory committees and study groups, including the Naval Research Advisory Committee; the Defense Science Board; the National Academy of Sciences' committees on undersea warfare, oceanography and geodesy; the steering committee for the NSF RIDGE program; and advisory committees for marine programs at UC Santa Cruz, UC Santa Barbara, the University of Miami and Woods Hole Oceanographic Institution.

He was chair or co-chair for more than 20 successful Ph.D. candidates, four of whom are now full professors in the University of California system.

He was a fellow of the American Geophysical Union, the Acoustical Society of America and the Marine Technology Society, and a member of the Maritime Historical Society, the Society for Industrial Archeology,

Sigma Xi and Phi Beta Kappa. During 1990-92 he was president of the Ocean Sciences section of the American Geophysical Union and chaired its Fellows Committee in 1994-96. He was also an active member of the Scholia Club of San Diego.

In 1965 he was awarded the Franklin Institute's Wetherill Medal for his role in the development of FLIP. He received the Marine Technology Society's Distinguished Achievement Award in 1971. He was presented the U.S. Navy's highest award for scientific achievement, the Captain Robert Dexter Conrad Award, in 1974 for "outstanding achievement in planning, conducting and administration of research and development."

In 1980 the American Association for the Advancement of Science awarded Spiess and his coauthors the Newcomb Cleveland Prize for the outstanding paper published in Science that year. In 1983 he received the Maurice Ewing medal from the American Geophysical Union and the U.S. Navy for outstanding contributions to marine geophysics. In 1985 he was awarded the Acoustical Society of America's Pioneers of Underwater Acoustics medal and the Lockheed Award for Ocean Science and Engineering from the Marine Technology Society.

In 1985 he was elected a member of the National Academy of Engineering for significant breakthroughs in ocean engineering, including the development of FLIP, Deep Tow and precision benthic navigation. In 1990 he received the Navy Distinguished Service Award for leadership in ocean technology. Most recently, he was awarded the 2006 Distinguished Technical Achievement Award from the Oceanic Engineering Society of the Institute of Electrical and Electronics Engineers "for six decades of advances in ocean engineering while developing sea-going research tools." His daughter Kathy Dallaire will accept the award on his behalf on September 20.

Spiess served the University of California Academic Senate both locally and UC-wide. At UC San Diego, he was chair of the Committee on Planning and Budget during 1986-88, the Graduate Council in 1983-84, the Committee on Privilege and Tenure in the 1970s and chair of the San Diego Division in 1985-86. He served as vice chair and chair of the UC-wide Academic Council and Assembly in 1988-89 and 89-90, respectively, including acting as one of the two faculty representatives on the UC Board of Regents during that period. From 1998 to 2001 he chaired the UC Academic Senate Task Force for the startup of UC's new campus at Merced. His contributions in this arena were recognized in 2000 with the Oliver Johnson Award for outstanding service to the Academic Senate.

At Scripps he served on and chaired many committees, including Scripps Staff Council (1962-64). He was a leader in the restoration of the historic Old Scripps Building, including serving on the Building Restoration Committee (1976-87). He was awarded the UC San Diego Campus Ministry Award for academic leadership in 1989.

In addition to his university and civic activities, he was the moderator of the Congregational Church of La Jolla during 1984-85, and served for many years as the church's financial secretary.

Spiess resided in La Jolla, Calif. He was married for 60 years to the late Sarah (Sally) Whitton Spiess, a tireless supporter of Spiess's work at Scripps Oceanography, the Scripps Marine Physical Laboratory, UC San Diego and the community at large. Both Spiess and his wife were active members of Scripps Estates Associates. He is survived by five children (Katherine Dallaire of Chester, NH; Mary Elizabeth De Jong of San Francisco, CA; Morgen Spiess of Seattle, WA; Helen Spiess Shamble of Santa Clara CA; and Peggy DeLigio Spiess of Eugene, OR); four sons-in-law; eight grandchildren and three great-grandchildren.

A memorial service will be held at the La Jolla Congregational Church, 1216 Cave Street, La Jolla, at noon on Sunday, September 17, immediately following the morning service. All friends and associates are welcome. Another memorial celebration will take place in mid-October at Scripps Institution of Oceanography. For information on the Scripps memorial, please call (858) 534-3948.

Should you wish to make a donation in his honor, the family suggests your favorite charity or one of his, such as the Maritime Museum of San Diego, America's Finest City Dixieland Jazz Society or the Doris A. Howell Service (a clinical consultation service for palliative and supportive care) at the UCSD Medical Center.

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