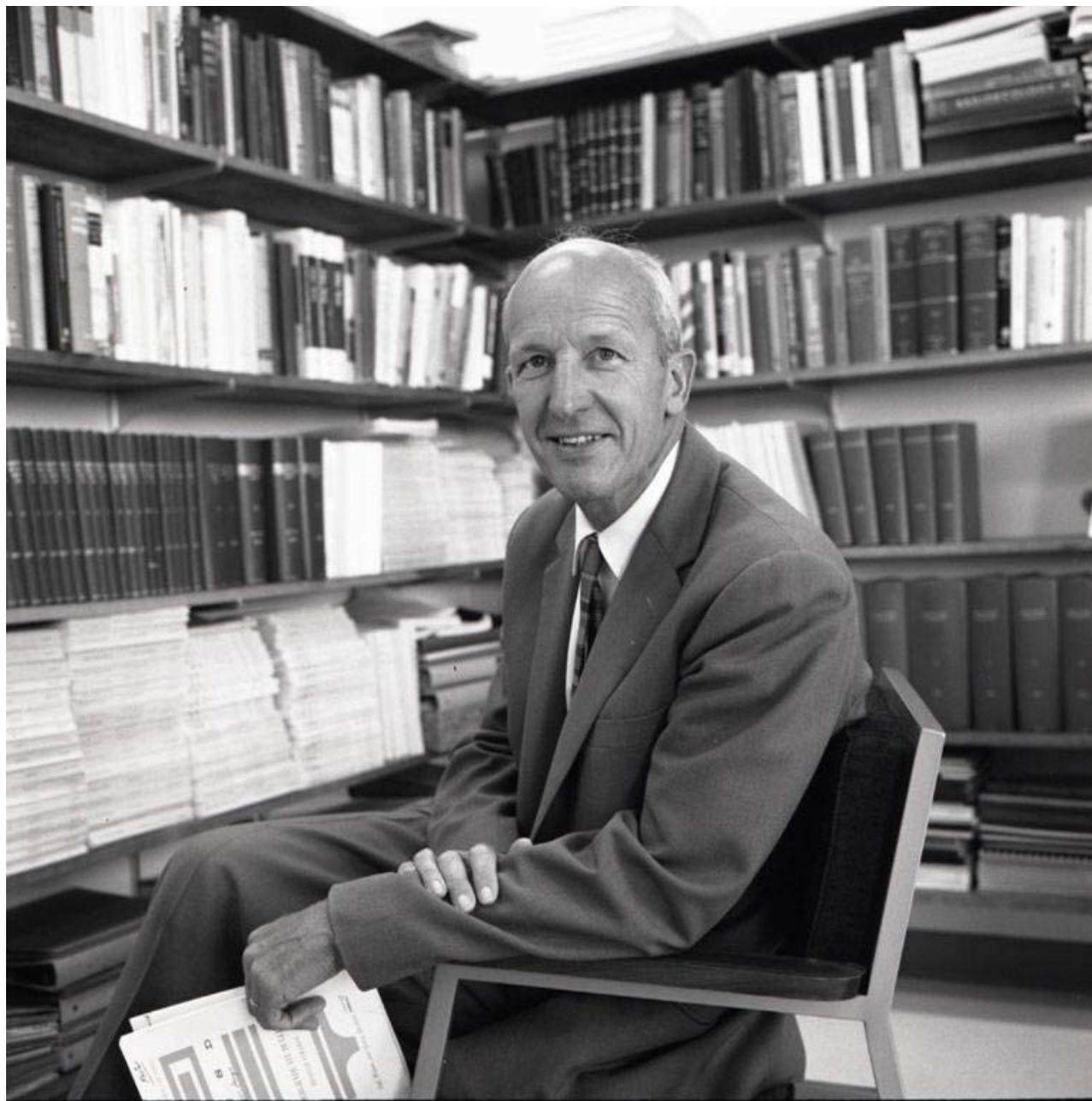


## Hugh Bradner (November 5, 1915 - May 5, 2008) Biography



Hugh Bradner was born November 5, 1915 in Tonopah, Nevada. His father Donald Byal Bradner was briefly director of the Chemical Warfare Service at Edgewood Arsenal in Maryland and taught his son to swim by throwing him into the Gunpowder River in 1918. Hugh Bradner joined a number of swimming clubs as an undergraduate at Miami University in Ohio before receiving his A.B. degree in 1936. He went on to the California Institute of Technology and received a Ph.D. in physics in 1941. While at CalTech, Bradner continued to swim, and joined the polo and tennis teams. He and J. Earl Thomas, a fellow graduate student developed a diving apparatus and tried it out at Punta Banda around 1938. Bradner's primary activity was always physics, but throughout his life his avocations were diving and sailing. He has been credited by David Eisenstadt of the LA Times and others as the inventor of the wet suit.

Bradner worked for the U.S. Naval Ordnance Laboratory in Washington D.C. from 1941-1943 on problems of naval mine warfare. From 1943-1946, he moved to Los Alamos to work on the Manhattan Project. His assignment was to work with high explosives on the implosion of the atomic bomb. He worked closely with Johnny Von Neumann and George Kistiakowsky, and later worked with Luis Alvarez on electronic detonators.

Bradner was an observer at the Trinity test on July 16, 1945. While at Los Alamos, he met Marjorie Hall; they were married at Los Alamos in 1943. Security was so strict that their parents were not allowed to attend the ceremony, but J. Robert Oppenheimer attended as did many of the Los Alamos scientists.

Bradner was offered a position in high-energy physics at the Radiation Laboratory, UC Berkeley in 1946 working in Luis Alvarez's physics group and remained there until 1961. He traveled to Eniwetok to work on the Pacific atomic bomb test of 1951, and there he made a number of dives using equipment like Churchill fins and face plates and an open circuit regulator. In the spring of 1951 Bradner decided to spend some "weekend time" improving diving equipment for navy frogmen. He sent ideas and concepts for a diving suit to UC Berkeley physicist, Lauriston C. "Larry" Marshall, who was involved in a U.S. Navy/National Research Council Panel on Underwater Swimmers. Bradner wrote Marshall that suits do not need to be watertight if thermal insulation is obtained by air entrapped in the material of the suit. The diver does not have to be dry to stay warm. He began testing wet suit models in the fall of 1951 with colleagues at the Berkeley Radiation Lab.

In December 1951, Bradner was one of the scientists invited to attend the Swimmer Symposium ("Swimposium") held in Coronado, California. This symposium brought together operational, technical, civilian, and military people to discuss mutual problems and ideas. Bradner focused on the design of a wet suit for the military underwater swimmer and began working with different materials. Meanwhile, divers at the Scripps Institution of Oceanography were experimenting with the new SCUBA regulator invented by Cousteau. Bradner met Conrad Limbaugh, Andy Rechnitzer and others and had them test his wet suit designs at their scuba training classes held in the pool of the La Jolla Beach and Tennis Club. Willard Bascom, a Scripps engineer, recommended that Bradner try a unicellular material made by Rubatex. Bradner developed a foam suit using a material of unicellular neoprene. Bradner applied for a patent for his suit, but the patent office eventually decided that his design was too similar to flight suits to be patented. The Navy was slow to produce a wet suit for their own use, so they declassified the design, and encouraged commercial production in 1952. Bradner collaborated with a group of engineers at UC Berkeley on the design of a commercial wet suit using the rubatex material. The engineers formed a company under the guidance of Dave Garbellano, an engineer-physicist at UC Berkeley, called Engineering Development Company (EDCO). Foam plastic materials like ensolite and rubazot were already being used internationally for many purposes, however Bradner was the first person to use the unicellular foam plastic material neoprene for exposure swim suits. EDCO used other materials to improve their suit several years later. Bradner always considered the development of the wetsuit to be a collaborative effort that grew slowly out of the work of many individuals in the diving, science and manufacturing communities. He never claimed to be its sole inventor.

In 1961, Bradner became a research geophysicist at the Institute of Geophysics and Planetary Physics at Scripps Institution of Oceanography. He became a professor in 1964. He served as Acting Provost of Revelle College, 1966-1967 and remained at Scripps and UCSD until his retirement in 1980. Dr. Bradner published extensively in the fields of physics, seismology, geophysics and diving. He was a member of the DUMAND (Deep Muon and Neutrino Detection) Steering Committee.

Dr. Bradner was a fellow of the American Physical Society, a member of Phi Beta Kappa and Sigma Xi. He was a member of the American Geophysical Union and the Seismological Society of America. Dr. Bradner was active in a number of local organizations. He served on the San Diego Planetarium Joint Powers Board 1969-1970. He was on the board of the San Diego Hall of Science for several years beginning in 1975. He was a member of the La Jolla Civic Orchestra and Chorus, a member of the American Surfing Association. He served as a member of the UCSD Committee on Athletics, the Intercampus Athletic Advisory Board, and the National Association of Intercollegiate Athletics. He served on many national, state and university committees concerned with diving safety. Dr. Bradner received the Miami University medal in 1960 and an honorary doctorate from Miami University in 1961.

Dr. Bradner died in San Diego May 5, 2008 at the age of 92, less than a month after the death of his wife Marjorie Hall Bradner.