



Eric Dyer

IRA DYER

1925–2016

Elected in 1976

“Founder of research and educational programs in ocean engineering and an authority on noise and turbulence.”

BY ARTHUR BAGGEROER, PHIL ABBOT,
AND PETER MIKHALEVSKY

IRA DYER—educator, scholar, leader, sailor, opera buff, and beloved husband, father, grandfather, brother, and uncle—died peacefully at his home in Marblehead, Massachusetts, on October 9, 2016. He was 91.

A physicist, Ira’s distinguished career in acoustics spanned more than six decades. His seminal research had profound impacts in the fields of aeroacoustics, structural acoustics, and underwater acoustics. He was a valued educator and mentor for many students who are now prominent scientists. He was head of the Ocean Engineering Department at the Massachusetts Institute of Technology for 10 years, president of the Acoustical Society of America, and served on numerous committees, blue ribbon panels, and advisory boards for many government agencies and research companies.

Ira was the son of Charles and Frieda (née Griffman) Dyer, who were forced to flee the Pale of Settlement in Russia, arriving in the United States with a young daughter and almost nothing else. Ira was born June 14, 1925, in Brooklyn, New York, and as a child lived in every borough of New York City

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but Staten Island. He thrived as a student at Brooklyn Tech, where his scientific interests were nurtured.

He served in the Army Air Corps during World War II and then studied at MIT under the GI bill, receiving his BS, MS, and, in 1954, PhD, all in physics. His thesis advisors were K. Uno Ingard, Richard H. Bolt, and Philip M. Morse, all members of either the NAE or NAS.

He married his sweetheart, Betty Ruth Schanberg, of Clinton, MA, in 1949. They were happily married for 68 years and raised two children, Samuel and Debora.

After his graduate studies, Ira joined Bolt Beranek and Newman Inc. (now Raytheon-BBN). He was the seventh employee hired at BBN by Leo Beranek, who would later say that Ira was one of the three most important people responsible for the success of the company.

In one of his first projects (1951), Ira designed, built, and tested an ultrasonic brain scanner. It was intended to use active sonar to find brain tumors, and Ira himself was the first person to undergo a brain scan. The system ended up only measuring bone thickness but it paved the way for the ultrasonic scanners currently used in medicine (in cardiology and during pregnancy). Ira later led others in an applied research division that investigated all aspects of sound and vibration in complex structures such as ships, submarines, aircraft, and spacecraft.

During the mid-1950s he helped design the US Navy X-1 submarine, a small four-man diesel-electric submarine that had very low radiated noise levels and was advocated by Admiral Hyman Rickover for future designs. Ira designed an innovative engine mounting system—triple-stage isolation mounts—that significantly quieted the vehicle, allowing the submarine to pass the sound requirements. The isolation concepts led the way for the US Navy to develop ultraquiet submarines, providing important advantages for US submarine operations during the Cold War. The X-1 submarine is on display at the Submarine Force Museum in Groton, Connecticut.

For many more years Ira played a major role in advising, researching, and designing antisubmarine warfare systems for

the Navy, keeping the nation safe during the Cold War. He also contributed to a high-level Navy technical committee, the Submarine Superiority Technical Advisory Group, which led to the contemporary submarine sonar signal processing suite, the APB-ARCI¹ system.

His early work was honored in 1960 by the Acoustical Society's Biennial Award (now the R. Bruce Lindsay Award), which recognizes scientists under 35 for their outstanding contributions to acoustics.

In 1971 Ira accepted the positions of head of the Department of Naval Architecture and Marine Engineering and director of MIT's Sea Grant Program, created to stimulate research and wise use of the oceans. Under his leadership the program became a model and was widely emulated. He also led the department into new areas in ocean engineering, emphasizing learning about the ocean environment and nurturing new subjects in ocean acoustics, especially in conjunction with the MIT-Woods Hole Oceanographic Institution Joint Program.

In 1989 he was named the Weber-Shaughness Professor of Ocean Engineering. His expertise and graduate course in ocean acoustics were legendary. He was a consummate professor, both as a lecturer and one on one, with a clarity that inspired his students.

His joy was in both challenging conventional thinking and being challenged by colleagues and students. If one of his students said, "The data doesn't agree with the theory," Ira would wag his finger and say, "No, no...the theory does not agree with the data!" Meetings with Ira are recalled with gusto. He challenged all to continuously learn and acquire knowledge. And he inspired many, including his grandsons, to pursue careers in science and engineering.

He also led six Arctic field programs. The first, the Canadian Basin Arctic Reverberation Experiment (in 1978), imaged the entire Arctic basin with acoustics, providing evidence of a sea-mount range, now tentatively named the G. Leonard Johnson

¹ Advanced processor build-acoustic rapid COTS (commercial off-the-shelf) insertion.

Seamount after a legendary Office of Naval Research sponsor. Ira and his students developed a taxonomy of ice noise events that has been fundamental for understanding Arctic noise.

Ira made many seminal contributions to acoustics that were published in the *Journal of the Acoustical Society of America* (JASA). His 1970 article "Statistics of Sound Propagation in the Ocean" (JASA 48:337–345) remains one of the most cited, as are his significant contributions to structural acoustics, reverberation, and ambient noise in the sea. The programs he established in these technical areas were international in scope, leading and focusing global expertise.

As an independent research consultant during the last 20 years, Ira served on the board of directors and provided expertise to local ocean acoustic consulting firms founded by some of his former students. He was instrumental in helping solve a pump vibration problem that affected the completion schedule of Boston's Deer Island Waste Water Treatment Plant, a major construction project to eliminate pollution in Boston Harbor. He identified an organ pipe-like resonance in one of the inlet pipes that coupled into and accentuated the pump vibration levels; the solution enabled the pump to operate safely and the project to move forward.

In addition to his NAE membership, Ira was a fellow of the Acoustical Society of America (ASA) and the Institute of Electrical and Electronics Engineers, and a visiting fellow of Emmanuel College at Cambridge University. He was the recipient of many honors, including the ASA's Gold Medal (1996), its highest honor, and the Per Bruel Gold Medal (2002) from the American Society of Mechanical Engineers (ASME).

Ira and Betty were a classic American-immigrant success story. Their philanthropy encompassed medical research, the arts, community causes, Clark University, and MIT, where they set up a student scholarship in honor of his parents. And after the collapse of the Soviet Union, they worked with Action for Soviet Jewry, helping place Soviet refugees in appropriate jobs and sponsoring a newly arrived family.

Ira took great pleasure in family and friends. Sailing was among his most enjoyable pursuits and, always the educator,

he would mentor one and all as they took the helm of his several yachts, all named *Coriolis*.

He will be deeply missed.

He is survived by Betty, Samuel (Barbara) and Debora (John) Mayer, and grandchildren Ethan Dyer (MIT PhD in physics) and Charley and Owen Mayer (Drexel University PhD in electrical and computer engineering).