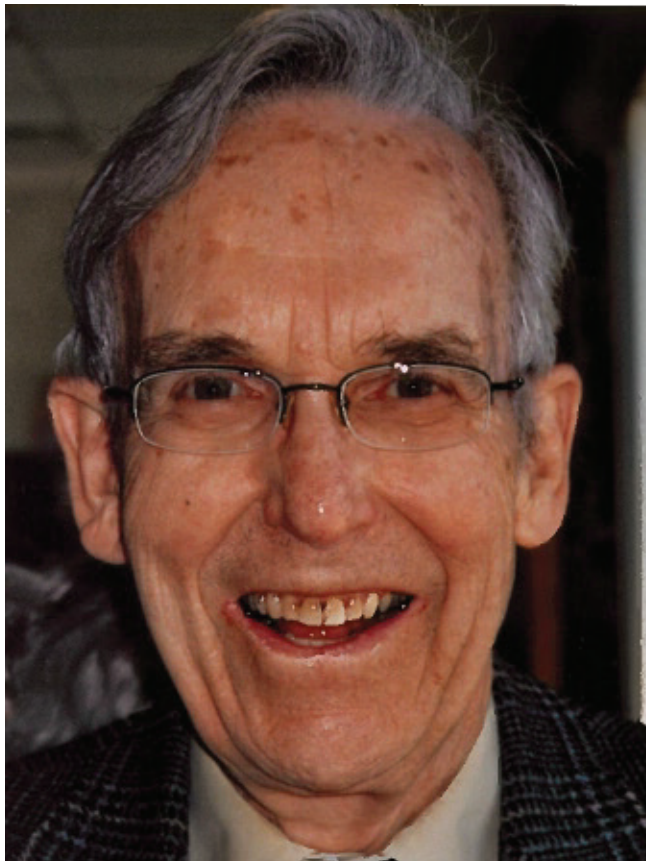

WILLIAM W. LANG

1926–2016

Elected in 1978

"Contributions and leadership in the field of noise control engineering."

BY GEORGE C. MALING JR.

WILLIAM WARNER LANG, a leader in noise control engineering at IBM and in standards development and professional organizations, died October 23, 2016, at the age of 90.

Bill was born August 9, 1926, to Warner and Lila G. (née Wheeler) Lang in Boston and graduated from the Noble and Greenough School in 1943, when he enrolled at MIT. World War II was raging and when he finished his sophomore year in 1944 and turned 18, he enlisted in the Navy, went to radio tech school, and became a sonar operator on the USS *Duluth*. Through the Naval ROTC he got his BS in physics at Iowa State University in 1946 and was commissioned as an officer. He was released from active duty in 1947 and returned to MIT to study acoustics in the physics department. In 1949 he finished his MS in acoustics and went to work for architectural-acoustical firm Bolt Beranek and Newman in Cambridge, Massachusetts. He didn't stay long at BBN, but remained a lifelong colleague of Dick Bolt and Leo Beranek.

This tribute is based on a memorial session held at the INTER-NOISE Congress in Chicago on August 18, 2018. The author is grateful to Bill's son as well as Robert Hellweg, Matthew Nobile, Eric Wood, and David Yeager for permission to edit and use selections from their presentations in this tribute.

He was still active in the Naval Reserve, and in 1951 was offered a position as a physics instructor at the new Naval Postgraduate School in Monterey, California, which he accepted. He consulted for DuPont in noise control.

In 1958 Bill returned to Iowa State for his PhD in physics and then, during a postdoc at MIT, was recruited by IBM in Poughkeepsie, New York, to develop a noise control program. Years later, I learned that Thomas J. Watson Jr. himself had dictated a memo that in essence said: 'Our customers have recently been complaining about the noise of our products. I think we need an acoustics laboratory to solve some of these.' The first step was facilities. Bill designed and built an acoustics laboratory with an anechoic chamber that was convertible from fully anechoic to semi-anechoic. He also designed and built a reverberation room.

Noise emission standards are a key element in any machinery noise control program, and much of the early 1960s was spent in the development of internal IBM standards. Other IBM locations soon began to develop acoustical facilities, and Bill maintained some control through corporate assignments in both standards and technology. Eventually IBM had acoustics laboratories in Endicott, New York; Rochester, Minnesota; San Jose, California; Austin, Texas; and Boca Raton, Florida, as well as Brazil, Germany, Japan, and elsewhere for a total of sixteen.

One of Bill's side projects was working with the Institute of Electrical and Electronics Engineers (IEEE), especially with the Technical Group on Audio and Electroacoustics. While at IBM, he became chair of the administrative committee (ADCOM) of the technical group and essentially saved the group from extinction.

Soon, IBM's Jim Cooley came on the scene with the introduction (actually, reintroduction) of what became the fast Fourier transform (FFT) algorithm. Everyone involved recognized the algorithm as a major breakthrough in the machine computation of Fourier series, and Bill led the effort to collect papers related to acoustics and signal processing for publication in the *Proceedings of the IEEE*. The June 1967 issue contained,

among other articles, "What is the fast Fourier transform?" and became a classic document in the field. The group had a new mission: signal processing.

In 1970 Bill established a working group (WG 6 under ISO TC43 SC1 – Noise) of the International Organization for Standardization (ISO) to develop international noise standards and continued to support ISO noise standards development through ISO TC43 SC1 WG 28 for many years. With continuous improvement, the standards are still used today.

Bill was a founder of several professional organizations, including the Institute of Noise Control Engineering of the USA (INCE-USA), the International Institute of Noise Control Engineering (I-INCE), and the INCE Foundation. He was instrumental in the founding of the international INTER-NOISE conferences on noise control engineering; the first was held in Washington in 1972 and led directly to passage of the Noise Control Act of 1972 by Congress. The 50th INTER-NOISE congress will take place in 2021 in Washington.

He was a registered professional engineer in New York state and a Distinguished Noise Control Engineer, fellow, and past president of INCE-USA, past president of I-INCE, and a fellow of American Association for the Advancement of Science, Acoustical Society of America (ASA; also past treasurer), and IEEE. He was an honorary member of the Institute of Acoustics (UK) and US National Council of Acoustical Consultants. He received the ASA Silver Medal in Noise and, from the Hungarian Optical, Acoustical, and Film Technical Society, the Pro Silentio Medal.

The achievement Bill was most proud of was his election to the NAE in 1978. His long relationship with the NAE led him to believe that IBM would benefit from the establishment of an internal Academy of Technology, and he set about convincing upper management that such an academy was necessary. It became a reality and Bill retired soon afterward, in 1992. The IBM Academy of Technology was patterned after the NAE, and the first meeting was held at the NAE in Washington in 1989 with then NAE president Robert M. White as the keynote speaker. Asked recently about the role of the IBM Academy

in a new series of strategic initiatives, John Kelly, a senior vice president who oversees the Academy, told me that "The Academy was very instrumental in driving our focus on our strategic initiatives. The Academy is doing quite well, and remains vital to IBM." This is a major tribute to one of Bill's innovative contributions to IBM.

In 2004 Bill worked with NAE management to develop an initiative in noise control engineering. A scoping workshop was held in 2005 and led to a consensus study and report, *Technology for a Quieter America* (National Academies Press, 2010). Proceedings of a second workshop, *Protecting National Park Soundscapes*, were published in 2013.

A follow-on program yielded six public information documents (available on the INCE-USA website). Bill attended a workshop on technology transfer in noise control engineering, hosted by the NAE in Washington on October 11–12, 2016, about 10 days before his passing.

Speaking at the May 2017 workshop titled "Commercial Aviation: A New Era," NAE president Dan Mote recognized Bill's contributions to the Academy:

> He was as passionate as anyone I have known about the importance of member participation in the work of the [NAE]. In 2014 he prepared a report for me that he titled 'Unleashing the Intellectual Brilliance of the National Academies.' His vision in that report: to have the three national academies operate as a single influential academy, offering its members new opportunities to serve the immediate and long-term needs of the nation. He felt that increasing collaborative member participation in the work of the academies was essential to avoid stagnation caused by failure to keep up with the rapidly changing modern world…. [T]he three academies now work together closely, and the NAE Council also created the opportunity for member-initiated programs that advance the NAE mission and objectives. Six workshops have been developed under the new policy, which was announced in October 2016 when Bill was in the hospital, a few days before his passing. He would have been very pleased and proud to know that his ideas and initiatives led to these changes in how the NAE engages its members and other academies.

Bill married Asta Ingard, the love of his life and inspiration, in 1954; she had traveled from Sweden to visit her brother Uno as he received a medal at the ASA meeting in Boston. Bill was at that meeting, and it was love at first sight for the two of them. He dedicated his life's work to her. She passed away in 2003. They are survived by son Robert W. Lang, daughter-in-law Bogumila, and two grandsons Lucjan Olaf and Colin.