

Obituary

Jeffrey A. Nystuen, 1957–2020



Jeffrey A. Nystuen, an admired colleague in the acoustics and oceanography communities, recently passed away. Jeff was a Principal Oceanographer at the Applied Physics Laboratory (APL) at the University of Washington (UW), Seattle, from 1995 until his retirement in 2018. Jeff was the recipient of the 2003 Medwin Prize of the Acoustical Society of America (ASA) and was named ASA Fellow in the same year. Jeff was born in Seattle, grew up in Ann Arbor, MI, and was a graduate of the University of Michigan and Scripps Institute of Oceanography/University of California, San Diego, La Jolla.

Jeff is widely regarded as a pioneer in acoustic rainfall measurement. By monitoring the sound of rain falling on the ocean, Jeff was able to learn about patterns of rainfall and cloud formation over the open ocean. Knowing more about the role of rainfall has given meteorologists a better understanding of weather phenomena such as El Niño and the floods and droughts that it triggers around the world.

Jeff's interest in acoustic rain measurement was inspired by the suggestion from his doctoral advisor Robert Stewart and coadvisor Walter Munk at Scripps. The remote sensing of satellite/radar rain measurement provides large surface coverage, yet the spatial resolution is poor and needs local ground truth for the calibration. To measure the "local" rain rate at sea is no easy task due to the destructive force at the air-sea interface. The passive acoustic method provides an alternative to measuring the rainfall away from the air-sea interface and with a much larger surface coverage area than the conventional accumulation-type rain gauge on a surface buoy. Because the rain pattern is intermittent and varies spatially, the passive acoustic method is better, in theory.

While as a faculty member at the Naval Postgraduate School in Monterey, CA, Jeff studied the sound of individual raindrop splashes with Herman Medwin. They used an abandoned elevator shaft as an acoustic chamber to drip various sizes of water drops and recorded the sound generated individually. They discovered a new sound-generating mechanism due to the bubble entrapment and improved predictions of the underwater sound produced.

In 1995, Jeff moved to the APL and later became an affiliate faculty member at the School of Oceanography at the UW. There he developed a passive acoustic recording system called Passive Aquatic Listeners (PALs). He advocated for a smaller data size through intelligent sampling schemes. He established a field program to measure rainfall at sea using his acoustical technique and collaborated with colleagues around the world.

Jeff was a generous and insightful colleague, collaborator, advisor, and mentor. His perspective gave the sound of rainfall a special meaning. Whenever we hear raindrops on water, we think of him.

He is survived by his parents in Ann Arbor, sister and brother-in-law in Massachusetts, and many friends in Seattle and around the world.

Selected Publications by Jeffrey A. Nystuen

- Ma, B. B., Nystuen, J. A., and Lien, R.-C. (2005). Prediction of underwater sound levels from rain and wind. *The Journal of the Acoustical Society of America* 117, 3555-3565.
- Nystuen, J. A. (1986). Rainfall measurements using underwater ambient noise. *The Journal of the Acoustical Society of America* 79, 972-982.
- Nystuen, J. A. (2001). Listening to raindrops from underwater: An acoustic disdrometer. *Journal of Atmospheric and Oceanic Technology* 18, 1640-1657.
- Nystuen, J. A., and Medwin, H. (1995). Underwater sound produced by rainfall: Secondary splashes of aerosols. *The Journal of the Acoustical Society of America* 97, 1606-1613.

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