

Studying climate-change induced Arctic ice melting using an acoustics-based approach by Dr Hari Vishnu

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OES Society, Delhi Chapter



Invited Talk

Dr Hari Vishnu

Senior Research Fellow
National University of Singapore

Hari is a Research Fellow at ARL working on underwater acoustic signal processing and machine learning. His interests include machine learning for underwater applications, bio-acoustics and signal processing in impulsive noise.



Website:

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About Dr Hari Vishnu:

Dr. Hari Vishnu is a Senior Research Fellow at National University of Singapore working on underwater acoustic signal processing and machine learning (ML). His interests include ML for underwater applications, bio-acoustics and signal processing in impulsive noise. These are used in a wide range of applications, spanning from biodiversity or defense-related scenarios in shallow tropical waters infested with snapping shrimp noise, to the mineral resources in the depths of the ocean, to the Arctic ice sheets where glacier melt noise dominates the soundscape. He obtained his Ph.D degree from the Nanyang Technological University, Singapore, in Computer Engineering, and prior to that, his B.Tech in EEE from National Institute of Technology, Calicut.

He is the Chief Editor on the Oceanic Engineering society (OES) Science outreach magazine Earthzine. In 2019, he was awarded the IEEE OES's YP-BOOST award which aims to encourage young professionals to participate in the leadership of the society. He was the chair of the IEEE OES, Singapore chapter for 2018-2020, Secretary of the Singapore AUV Challenge since 2016, and continues to serve on the executive committee of these organizations. In 2020, he was featured on interviews by IEEE TryEngineering, on the importance of ocean awareness and education, showcased as part of the TryEngg. spotlight and TryEngg.

Talk Abstract

The Arctic is one of the focal points of global climate change, with surface temperatures rising twice as fast as the rest of the world. A significant component of the global sea-level rise is attributed to melting glaciers and ice-caps such as those found in Svalbard in the Arctic. Underwater melting at the glacier-water interface accounts for a significant component of the ice lost from marine-terminating glaciers. This melting produces a distinct sound similar to 'frying bacon or chips' due to explosion of bubbles underwater. This sound travels over long distances underwater. Thus, it is a promising medium to characterize ice-loss using relatively cheap recording equipment over longer periods and larger scales than visual systems, and with more resolution than conventional methods such as satellite imagery. Passive acoustic monitoring (PAM) techniques are suitable for extracting information on the climate-change related mechanisms in these glacial bays, because sound data is simple to acquire, covers a large area, and can facilitate long-term monitoring. To evaluate the use of PAM to understand glacial ice-melt, in 2019, my collaborators deployed a vertical hydrophone array and made acoustic measurements at some glaciers in Svalbard. Quantification via array processing proves to be challenging due to the space- and time-varying sound-speed profile in the underwater channel, and the way it refracts sound in an unknown manner. I will present preliminary insights and results from the processing of this data which reveal different acoustic levels arising from melting at different glaciers. The sound from the melt is shown to be more dominant in the upper layers of the water at the glacier-sea interface.



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Studying climate-change induced Arctic ice melting using an acoustics-based approach

Date: 29th September, 2021 Time: 1:30 PM (IST) / 4:00 PM (SGT)



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Talk Outline:

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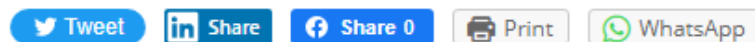
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To create educational and research opportunities at graduate and doctoral levels.

ABOUT OES

OES strives for the advancement of the theory and practice of electrotechnology, allied branches of engineering, and related arts and sciences, applied to all bodies of water. The Society promotes close cooperation and exchange of technical information among its members through publications and meetings. It promotes collaboration and providing a platform for students to showcase the work and learn more.

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