



## **Industrial and National Security Applications of Acoustics, Signal Processing, and Immersive Reality Research**



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**Seminar: Thursday, Mar 2, 10 AM, 125 Reber**

#### **ABSTRACT**

The Acoustics, Signal Processing, and Immersive Reality (ASPIRe) Lab at Penn State strives to make advancements across a wide array of application areas, but with core strength in the underlying fundamentals in Acoustics/Vibrations and Statistical Signal Processing. This presentation will give a broad overview of the research efforts of the ASPIRe Lab past, present, and future, with emphasis on four major areas: Microphone Array Technology, Acoustics/Vibration-Based Machinery Health Monitoring, 3D Immersive Audio, and Electric Vehicle Safety. Special emphasis will be given to past and current projects that highlight potential collaboration across multiple research units at Penn State.

#### **BIOGRAPHY**

After finishing his MS degree in the Graduate Program in Acoustics at Penn State, Dr. Roan went to work at Noise Cancellation Technologies, Inc. in Linthicum, Maryland, and then moved on to Westinghouse ESG/Alliant Tech Systems. Having spent several years in industry, Dr. Roan decided to return to graduate school to finish his doctorate in Acoustics. While working full-time at the Applied Research Laboratory at Penn State, he received his PhD in Acoustics from Penn State in 1999 under the supervision of Dr. Leon Sibul. During the 2004 academic year, Dr. Roan was invited to work at Princeton University as a visiting fellow in the Electrical Engineering Department under the mentorship of Professor Stuart C. Schwartz. Dr. Roan's time at Princeton motivated him to pursue a career in academia, and in 2005 he moved to Virginia Tech for 16 years. In 2022, Dr. Roan returned to Penn State joining the ME department and the Applied Research Laboratory and has been working in the areas of Acoustics and Statistical Signal Processing, primarily in defense- and security-related areas. His recent interests include full 3D audio immersion for electric vehicle safety applications, virtual machinery prototyping, and theatre/concert sound.