Nick Snyder

For my project I chose acoustic imaging. In its simplest form, it is a way to see sounds. It uses an array of microphones to triangulate the source of a sound. There are a few acoustic imaging algorithms used today including beamforming, deconvolutions, and spectral estimation. Its most popular use is for automated inspection where a leak could be located by a faint but constant hissing sound at a valve inside a manufacturing plant. This inspection could be performed by a robot similar to Boston Dynamics' Spot and send an alert to plant maintenance staff. This inspection can also detect sounds with frequencies at the extremes or compare the sound to the normal operating sound of a machine. For instance, hearing a bearing wear prematurely could save the entire assembly line if it can be fixed before it fails. Some considerations and challenges of acoustic imaging are spatial resolution and how capable it is to separate near frequencies, background noise suppression, signal to noise ratio, and general location estimations. One use of acoustic imaging I found quite interesting was how it could be used to optimize the shapes and profiles of the wings of airplanes. Areas where noise was more pronounced could mean the air is not flowing efficiently over the surface and causing turbulence and a loss of lift.

Acoustic imaging was my second choice after stereoscopy. I had picked those two because I had seen videos of a long time ago so I thought it would be interesting to further explore the topics. Professor Messner thought I could more effectively pursue acoustic imaging over stereoscopy due to the very deep level of knowledge needed for researching it. I also greatly prefer the added safety and efficiency of automated testing and maintenance that can be achieved with methods such as this. If a worker knows the exact valve that it is leaking, the fix can be completed sooner and deliver a better product at the end of the line.