Exciting Naval Research Built on a Foundation of Rutgers Engineering

Dr. Alexey Titovich
NSWC Carderock Division

Abstract: The Naval Surface Warfare Center Carderock Division (NSWCCD) is at the forefront of producing innovative naval technologies. An overview of research topics and employment opportunities will be discussed. Emphasis will be placed on the NSWCCD Acoustic Research Detachment and the unique testing that takes place there. This premier naval facility conducts acoustic testing on model scale undersea vehicles at conditions that exist in only a few places on earth. The second part of the seminar will be a technical discussion of an acoustic metamaterial project for the ONR. This study expands the scope of traditional metamaterials by analyzing bilinear discontinuities in an otherwise continuous medium. This amplitude independent nonlinearity is sought for its practicality and utility. Analytical results are applied together with numerical methods to provide insight into the harmonic and subharmonic generation in acoustic metamaterials with properties differing from compression to rarefaction. Stability is analyzed and criteria for the onset of chaotic behavior discussed. Lastly, an electroactive circuit will be proposed as a means of producing this nonlinearity in a repeatable manner. The seminar will conclude with a look back at the author’s decade at Rutgers University and how that propelled him and other distinguished alumni to unbelievable heights in their professional careers.

Bio: Dr. Titovich is a research scientist in the Structural Acoustics and Target Strength group at the Naval Surface Warfare Center Carderock Division (NSWCCD) in Bethesda, MD. He earned his B.S., M.S., and Ph.D. degrees from Rutgers University, in 2009, 2011 and 2015, respectively, in Mechanical and Aerospace Engineering. At NSWCCD, he is a task lead on several large projects for the Columbia-class submarine program. As the head of the Carderock Division Acoustic Metamaterials Community of Interest, he coordinates research efforts in the field between the Naval Laboratories, Universities, and University Affiliated Research Centers. His primary research interests include structural acoustics, acoustic metamaterials, strongly nonlinear materials, and distributed sensing. Dr. Titovich remains active in cutting edge research, having recently secured a multi-year ONR ILIR grant for developing strongly nonlinear acoustic metamaterials. He is the author of two patents on fiber optic sensing and numerous peer-reviewed journal articles as well as invited presentations. Dr. Titovich also finds time to teach a course he organized at the NSWCCD on “Structural Acoustics”, which is gaining popularity across the command.

Contact Professor Aaron Mazzeo at aaron.mazzeo@rutgers.edu. Phone: (848) 445-0504 | Fax: (732) 445-3124