

Nonlinear solitary waves for nondestructive evaluation and structural health monitoring applications

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ABSTRACT

In the last two decades it has been demonstrated that highly nonlinear solitary waves (HNSWs) propagating in chains of granular particles can be used in many physics and engineering applications, including acoustic lenses, impurity detectors, and nondestructive evaluation (NDE). HNSWs are compact nondispersive waves that propagate in nonlinear medium such as 1D chains of spherical particles. In this talk, the application of HNSWs for the NDE and the structural health monitoring of a few civil engineering applications is presented.

Dr. Piervincenzo Rizzo received his Laurea (M.S. equivalent) in Aeronautical Engineering at the University of Palermo, Italy in 1998. After serving in the Italian Army Corps of Engineering, Dr. Rizzo moved to the U.S.A. where he received a Master (2002) and a Ph.D. (2004) in Structural Engineering at the University of California, San Diego. In September 2006 he became assistant professor at the Department of Civil and Environmental Engineering at the University of Pittsburgh. He was promoted to Associate Professor with tenure in 2012, and to Full Professor in 2018.

Dr. Rizzo's research interests are in the area of nondestructive evaluation and structural health monitoring using methods such as ultrasound, acoustic emission, solitary waves, infrared thermography, and electromechanical impedance. His research has been supported by the Pennsylvania Department of Transportation, the National Science Foundation, the Federal Railroad Administration, the U.S. National Academy of Sciences, and the American Society for Nondestructive Testing (ASNT).

From the ASNT, Dr. Rizzo received the 2002 Fellowship Award, the 2007 Faculty Grant Award, the 2009, 2015, and 2019 Fellowship Research Award, and the Outstanding Paper Award in 2013 and 2017. Dr. Rizzo is the first person worldwide who has received both the Achenbach Medal (in 2012) and the SHM Person of the Year Award (in 2015). The Medal recognizes one young individual who has made an outstanding contribution to the advancement of the field of SHM. The Award recognizes accomplishments within the past year or the past few years. Both honors are selected by the editors and associate editors of *Structural Health Monitoring: An International Journal*, the top academic journal on the subject. He is also the recipient of the 2016 University of Pittsburgh Chancellor's Distinguished Research Junior Scholar Award. The award includes faculty across the whole University, within 12 years from their Ph.D., who have demonstrated great potential and have achieved international standing.

Dr. Rizzo published 115 referred papers, 2 conference proceedings volume, 8 book chapters, over 200 conference proceedings and reports, and 2 patents. For more information, visit Dr. Rizzo's home page <http://www.pitt.edu/~pir3/>.

He is currently chairing the Organizing Committee of the 10th European Workshop in Structural Health Monitoring, scheduled to be held in Palermo on 4-7 July 2022.

