

SPECIAL SEMINAR

TIME REVERSAL IMAGING BY ADAPTIVE INTERFERENCE CANCELLATION¹

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Abstract

Electromagnetic (EM) waves propagating in a rich scattering environment reflect and scatter from many objects, inducing multiple paths from the transmitter to the receiver. Traditionally, multipath propagation adversely affects the reliability of the wireless channel, posing a challenge to many real world applications. In our work, we have developed novel algorithms based on time reversal to detect and image targets in highly cluttered environments. With time reversal, we reverse a signal dispersed by a scattering environment and retransmit it through the same (reciprocal) medium. We show, with experimentally measured electromagnetic data, that our time reversal algorithms obtain increased resolution and higher detectability. They achieve this by exploring constructively the scattering and multipath in the propagation channel. We have investigated several applications including radar detection and imaging, biomedical imaging, and guided wave pipeline inspection. In this talk, I will address my current and future research in these areas.

Speaker's Biography

Yuanwei Jin received the Ph.D. degree in electrical and computer engineering from the University of California at Davis in 2003. Since August 2008, he has been an Assistant Professor with Department of Engineering and Aviation Sciences at University of Maryland Eastern Shore (UMES). Prior to joining UMES, he was a Postdoctoral Research Fellow, then Project Scientist with the ECE Department at Carnegie Mellon University. His research interests are in the general area of statistical signal and image processing, with applications in radar/sonar, biomedical imaging, pipeline health monitoring, and wireless communications. He has published over 30 technical journal and conference papers. Dr. Jin was a recipient of the Earle C. Anthony Fellowship from the University of California at Davis. He is a senior member of the IEEE.

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