



**ASME IGTI *Manufacturing Materials & Metallurgy* Committee Tutorial of Basics
Practical Fractography of Metallic Structures**

December 8, 2020 * 1:00 pm - 3:00 pm Eastern Time

Presented by Robert Ware, Air Force Research Laboratory

Abstract

The author will present more than a dozen case histories collected over nearly 30 years analyzing aerospace failures at the Air Force Research Laboratory. The case histories have been selected so as to showcase a wide range of fractographic features, and how to interpret them. While some are from turbomachinery failures, most are from other classes of aerospace hardware including landing gear and other mechanical subsystems. Examples show overload fractures and using shear lips to identify fracture termination. Intergranular fractures caused by various mechanisms will also be presented. These mechanisms will include stress corrosion cracking of 7XXX aluminum alloys and of high strength steel, hydrogen embrittlement and sensitization of grain boundaries in Greek Ascoloy, and liquid metal embrittlement of high strength steels by cadmium. Interpretation of microscopic and macroscopic aspects of fatigue fracture surfaces will also be presented. The author will also describe failure analysis techniques he's observed, such as heat tinting before lab fracture so as to differentiate between service and lab induced fracture surfaces.