Abstract: Environmental stress cracking (ESC) has been estimated to be the prominent mechanism for about 25% of plastic part failures. Fundamentally, ESC is a slow-crack growth mechanism that requires sustained tensile stress, a susceptible polymer, and a material-specific aggressive chemical environment. The fracture features generated by ESC often share common traits with those for creep fracture (another slow-crack growth mechanism that occurs in the absence of chemical influence). With detailed characterization of a failed component and thorough consideration of potential chemical exposures during manufacturing and service, definitive confirmation of the ESC mechanism is possible in many instances. Furthermore, laboratory testing can be utilized to assess the risk of ESC for a given material-environment couple. This presentation will cover traits of materials that are most susceptible to ESC, some (of many) known material-environment couples that may cause ESC, failure features that may indicate the occurrence of ESC, and laboratory testing to assess ESC susceptibility.

Biography: Larry graduated from Iowa State University in 1978 with a bachelor's degree in Metallurgical Engineering. After graduation, he worked for about 10 years at Anamet Laboratories in Berkeley CA primarily doing Failure Analysis of metal and plastic components. He came to Minnesota to work for a small company doing Failure Analysis and consulting. In 1995, He founded Materials Evaluation and Engineering (MEE) to do Failure Analysis, advanced material characterization and product development for medical device manufacturers and other companies from several industries.
MEE has also performed Failure analyses to support product liability evaluations for insurance companies and law firms.

Throughout his career, Larry has been active in ASM. He was a founding member of the student chapter at ISU and chairman of the Golden Gate chapter in California from1990-91. He has also served as the chapter chair of the Minnesota chapter in 2000-2001. He was on the MSE industrial advisory committee at Iowa State from 1999-2005 and on the ASM International Board of Trustees 2016 - 2019. Larry was named a fellow of ASM in 2010 and has been a licensed metallurgical engineer since 1992. In addition to ASM, Larry has been a member of ASTM, SPE, NACE, AWS, STLE, NAFE, SMST, and IAAI.