Residual Stress: Friend or Foe? An introduction to residual stress and residual stress characterization methods

Instructor: Jeff Bunn, Oak Ridge National Laboratory

Overview:
Understanding the state of residual stress is critically important for material science and manufacturing. Residual stresses affect component and system design, manufacture, and application, but are also one of the most complex and less known phenomena of all the factors that impact product performance. Residual stresses are relatively simple to understand from a high-level, but the deeper one gets into the science and engineering, the more challenging the topic becomes.

This workshop will seek to give a general introduction to the concept of residual stresses, and how they arise in engineering materials and components. Then the workshop will move into how residual stresses can be characterized, this will include mechanical release methods such as slitting, contour method, and hole drilling as well as diffraction methods such as x-ray and neutron diffraction. All these methods are useful for various lengths scales of samples as well as processes which can induce residual stresses.