

## Atmospheric Corrosion through a Multiphysics Lens: The Linkage between Surface Environment and Electrochemical Processes

Atmospheric corrosion is a complex problem comprised of chemical, electrochemical and physical processes occurring across gaseous, liquid and solid phases and interfaces at multiple length scales. A foundational challenge inhibiting fundamental understanding of atmospheric corrosion is the limited ability to directly probe micro- and sub-microscale processes associated with electrolyte films and droplets that form on surfaces as a result of water sorption. This talk will overview research aimed at linking thermodynamic and kinetic considerations of the surface environment (e.g., electrolyte) to corrosion behavior. The discussion will focus on new experimental and computational approaches being developed to study this interrelationship for the specific case of sodium chloride electrolytes on copper and aluminum surfaces in humid atmospheres. The role of evolving electrolyte chemistry resultant from corrosion, and, in turn, its impact on corrosion damage distributions and rates will be addressed. We will conclude with a discussion of implications for existing atmospheric corrosion models and aging of nuclear waste containers.

### Bio:

Eric Schindelholz is a senior member of technical staff at Sandia National Laboratories, since 2014. His present work includes basic research in atmospheric corrosion, corrosion of additively manufactured metals and development of nanocomposite corrosion barriers films with tunable physical properties. He received his PhD in Materials Science at the University of Virginia in 2014 under the direction of Professor Robert Kelly. Prior to his studies at UVA, Eric served as a conservator in both federal and private institutions, specializing in the corrosion assessment and mitigation of historic artifacts and monuments.