**Service Life Prediction of Polymeric Materials: Focus 2020**

**Short Course: Full day (7 hour) workshop**

**Title: Introduction to Predicting In-Service Performance**

**Organizers: Chris White, David Burns, Jim Pickett**

After attending this workshop, the participant will understand the current state of the art for durability testing of polymeric materials. The short course will follow the steps outlined for the service life prediction (SLP) process and provide useful information for durability testing ranging from QC, product development, and standards testing to fully-validated SLP methods and protocols. The limitations of current methods and needs for future work will be discussed.

**Course outline:**

* **Step zero:** What are we trying to do?
  + Rationale for durability testing and SLP
  + Kinds of testing: QC to SLP
  + Trade-off between risk, costs, time
* **Step 1:** Defining the use environment
  + What we need to know for SLP
  + Sources of climatic data
  + Benchmark outdoor exposure conditions
* **Step 2:** Finding the responses of a material to environmental stresses
  + Experimental methods, kinetics, general degradation pathways
  + Light: action spectra, reciprocity, light sources
  + Heat: use and limitations of the Arrhenius equation and activation energies
  + Water: complexity of rain, humidity, condensation, ice; chemical and mechanical
  + Mechanical stress and strain
  + Interactions
* **Step 3:** Making predictions
  + Techniques and when to use them
  + Modeling: analytical, statistical, and cumulative damage models
  + Environmental simulation testing: improving existing methods, standards, data handling
  + Validation
* **Future directions**
  + Risk assessment with SLP: failure and liability
  + Standards: dealing with current ones and drafting new ones
  + Approaches to generate new knowledge
* **Roundtable perspectives from Industry members**.
  + **Short talks on how durability is important from different industry perspectives.**
* **Discussion.**