NIST Fundamentals of Uncertainty Analysis Short Course

April 28-30, 2015, 9:00 am – 5:00 pm
Building 222, Room A228-232
Instructors: Will Guthrie and Hung-kung Liu, NIST Statistical Engineering Division

Register for this Short Course

Purpose The NIST Fundamentals of Uncertainty Analysis Short Course covers the propagation of measurement uncertainty using the methods outlined in the JCGM *Guide to the Expression of Uncertainty in Measurement* from a statistical perspective. The short course will provide participants with a working knowledge of the methods needed to compute measurement uncertainties, hands-on experience in the application of these methods, and scientific and statistical insight into the interpretation of the results.

Agenda The NIST Fundamentals of Uncertainty Analysis Short Course is a 3-day course held on the NIST campus in Gaithersburg, Maryland. The course consists of lectures, demos, short exercises, and hands-on applications covering many aspects of the propagation of uncertainty using the methods outlined in the JCGM *Guide to the Expression of Uncertainty in Measurement*.

The hands-on applications will use functions for uncertainty analysis from the free software package, metRology, written for the open-source R statistical computing environment. The functions can be accessed directly in R (Windows/Mac/Linux), or via an Excel graphical user interface that is available as a free Excel add-in called metRology for Microsoft Excel (Windows only). Participants may bring their own laptops (NIST or personal), or laptops for use during the short course will be provided. If you would like to borrow a laptop, please let one of the instructors know as soon as possible.

Attendance is limited to 28 participants. Pre-registration through the NIST Commerce Learning Center is required and acceptance is determined on a first-come, first-served basis.

Topics Covered

- Importance of uncertainty analysis
- Different statistical approaches for uncertainty analysis
- Essentials of the GUM approach
    - Measurement functions
    - Type A and Type B methods for evaluating standard uncertainties
    - Degrees of freedom
    - Sensitivity coefficients
    - Propagation of standard uncertainties
    - Effective degrees of freedom
    - Expanded uncertainties
- Software for propagation of uncertainty
- Interpretation of results

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