

# NIST Fundamentals of Uncertainty Analysis Short Course

February 12-14, 2013, 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, 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 exercises and 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, or via an Excel graphical user interface that is available as a free Excel add-in called [metRology for Microsoft Excel](#). Participants may bring their own Windows laptops, 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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