**Course Description:** Overview of Fundamentals of Metrology

**Instructor:** Georgia Harris, National Institute of Standards and Technology (NIST) Office of Weights and Measures
Lisa Corn, Texas Department of Agriculture

**Course Description:** Fundamental measurement concepts are presented as applicable for any field of metrology: Who’s Who in Metrology and Accreditation, SI Basis for Measurements, Essential Elements of Traceability, Method Validation (Documented Procedures), Technical Competence (Proficiency Testing), Calibration Intervals, Measurement Assurance, Measurement Uncertainty, Calibration Certificates and Evaluations, Supplier Evaluation, and Assessing Traceability. Several sections will discuss risk management philosophies and approaches. Participants will obtain and know how to use several simple tools, job aids, and references to improve laboratory operations. This session is applicable for participants new to metrology, new to metrology management, as a refresher of fundamental concepts with a high-level view, or for anyone responsible for providing on-the-job training to new metrologists to help identify key concepts and prepare someone new to metrology for a successful career.

Activities and quizzes are integrated into each module with full participation expected. Participants must bring 4 documents that will be integrated in evaluation activities: 1) an example of a calibration certificate from their own laboratory (redacted if needed), 2) a calibration certificate from a supplier/vendor, 3) the laboratory Scope for the participant’s laboratory and 4) the laboratory Scope from the supplier/vendor of the certificate brought as item 2. Specific NIST OWM procedures that are referenced are posted here (https://www.nist.gov/pml/weights-and-measures/laboratory-metrology/calibration-procedures) and include: GMP 11, GMP 13, GLP 1, SOP 1, SOP 29, and SOP 30; pre-work reading, and familiarity is a good idea.

Note: this is a two-day course, with no specific measurement applications, and while similar to, it is not in alignment with the NIST OWM 5-day Fundamentals of Metrology seminar, is not a substitute for the successful completion of that seminar and will not meet subsequent course pre-requisites (such as the NIST Mass Seminar or Volume Seminar). See the full course, Table of Contents and examples of detailed learning objectives for overlapping topics that will be covered here: http://www.nist.gov/pml/wmd/labmetrology/fundamental-metrology.cfm.

**Learning Objectives:**

1. Identify and use reference materials to ensure quality, accurate, and traceable measurement results.
2. Explain highlights and key concepts of each topic to each other and to your managers.
3. Demonstrate how these topics fit in to a management system using ISO/IEC 17025:2017 as the basis.
Instructor Biography:
Work:
• State of Minnesota, Weights and Measures Division (5 years)
• National Institute of Standards and Technology (29 + years, retired/intermittent)

As a part of her NIST responsibilities, Georgia oversaw and provided metrology training at NIST and regional training events and ensured the development and compliance of the training program in the Office of Weights and Measures with the International Association for Continuing Education and Training. She maintains a membership in the Association for Talent Development to keep on top of adult training methodologies.

Speaking/Awards:
Ms. Harris has published and presented papers and conducted metrology and adult education training throughout the U.S., won best paper awards from MSC, NCSLI, and the American Society for Engineering Education, and has presented papers and conducted training at measurement conferences in Canada, Mexico, South Africa, and Colombia. She was a NIST liaison to the Measurement Science Conference for NIST Seminars for 12 years and a member of the NCSLI Board of Directors for nearly 20 years, including the position of President. She has won awards from MSC (1997 Andrew J. Woodington Award), NCSLI (2015 Education and Training Award, 2019 Wildhack Award), ASQ Measurement Quality Division (2011 Max J. Unis Award), two Bronze Medal awards from NIST, and was awarded a Fulbright Specialist grant in 2016.

Education:
• University of Minnesota, Moorhead, Biology/Chemistry (BA)
• Johns Hopkins University, Whiting School of Engineering, Technical Management (MS)