



2019 NCSL INTERNATIONAL  
WORKSHOP & SYMPOSIUM  
**August 24–29, 2019**  
Huntington Convention Center, Cleveland, OH  
**Call for Papers**  
Abstract Deadline March 31, 2019  
Manuscript Deadline May 20, 2019

NCSL INTERNATIONAL  
Serving the World of Measurement

Course Catalog Number: Tma-1  
Course Track: Mass Measurements  
Course Topic: Uncertainty  
Course Career Level: Beginner

**Sunday, August 25 | 1:00 PM - 5:00 PM | 1/2-Day PM (4 Hours)**

**Course Title: Automatic and Robot Efficiency Gains for the Modern Mass Metrology Lab**

**Instructors:** Mark Kliebenschaedel and Christian Mueller-Schoell, Mettler Toledo

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**Abstract:** It is not uncommon for a company to take delivery of a new mass comparator, or comparators, set them up, only to adjudge the instrument(s) to be underperforming, or be unfit for purpose!

It may be surprising to read that a very high majority of these cases occur because the user is unaware of what constitutes a professional mass laboratory. The Comparator gets the blame for poor performance, when reality shows that the Comparator is usually the best performing part of the uncertainty chain! Another standout symptom is the failure to have the manufacturer come to site to install this not-inexpensive investment! The difference between a barely usable instrument, and the best uncertainties you have ever achieved is often just one expert technician visit away!

Once installed, the Comparator must be subject to some form of Equipment Qualification (EQ) process. These high-performance balances are "Race Horses" that require an environment that meets the control requirements of the uncertainties needed to meet the required budget for the given echelon of Measurement Uncertainty. The testing employed should be scientifically meaningful.

The Qualification process will form part of a validation process, or as a standalone, will quantify and record the performance, helping to establish in-situ environmental impact, and give a structure to support correct implementation of the instrument.

The most common application for mass comparators is weight calibration. However, these instruments are frequently employed as higher performance balances for applications such as formulation, abrasion testing, differential weighing, gas bottle filling, etc. The question arises, how should mass comparators be tested, qualified and calibrated, when used in different missions?

Join us as we cover the essential components of a Comparator Qualification and Service. Whether used as a comparison device, or as a high performance, direct-reading balance or scale. We will cover the requirements for both schemas.

We will also spend some time looking into productivity gains and efficiencies, achieved by the careful and strategic investment in advanced instrumentation for weight calibration.

Employing robotic and automatic comparators in the modern Calibration Lab will not only greatly improve achieved uncertainties but will free-up personnel to complete other tasks, whilst the comparators are running their own calibration routines. Hence allowing multi-layer efficiency gains and performance improvements.

Join us for a rewarding and insightful tutorial with the world's leading expert on robotic and automatic mass comparison.

### **Learning Objectives:**

1. Attendees will learn how instruments are correctly, and scientifically tested in their given mission.
2. Understand the importance of environment, placement and appropriate testing regimes
3. Learn how a modern metrology lab can increase productivity and reduce uncertainties
4. Leave the session with a "Toolkit" to improve their own Comparator performance and capability

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### **Instructor Curriculum Vitae (CV):**

Mark Kliebenschäedel studied mechanical engineering and has worked as a Technical Specialist for automatic and robotic mass comparators for 12 years at Mettler Toledo. He is presently the product manager for automatic and robotic mass comparators and team leader of the service team which produces, installs, and services automatic and robotic mass comparators.

Christian Mueller-Schoell started his work in testing and calibration more than 25 years ago as a student of mechanical engineering at the University of Stuttgart (Germany). After graduation he started his professional career in accrediting and heading a testing lab and then moved on in 2002, to become the head and Q-manager of the mass and temperature calibration lab of Mettler-Toledo in Switzerland. Two years ago, he took up a new position as a Subject Matter Expert for metrology topics. His side occupations include membership in the International *ISO 17025* committee and being an accreditation assessor for calibration laboratories.