

# WEIGHTS & MEASURES CONNECTION

**NIST**

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## Weights and Measures

### Historical Moment

From the *Report of the Second Conference on Weights and Measures*, April 12, 1906.

In opening comments made by Dr. Stratton, Director of the Bureau of Standards, to all those gathered to participate in The Second National Meeting on Weights and Measures, he stated how pleasurable it was to see many new and old faces and that it was a pleasure to be able to confer with friends from many different states to hear and learn what they were doing. He was very interested in what they were doing right and what they were doing wrong.

While the Bureau of Standards (current day NIST) was very interested in weights and measures and "inaugurated the movement" Dr. Stratton said,

"...while it is our (weights and measures participants) duty to improve conditions affecting weights and measures, we believe that it will be better for you to perfect your own organization, (continued on pg 5)



What a welcome vision after a long, cold, snowy winter. This flowering tree is outside of the NIST Administration Building. A beautiful reminder that spring has finally arrived.



Pictures courtesy of Lisa Warfield and Linda Crown

*SPRING  
HAS  
SPRUNG*

## Office of Weights and Measures Sees Progress in Proficiency Testing

*Byline: Curt Suplee, PML*

Americans rely on many measurements of mass and volume in their daily lives, from weighing broccoli at the grocery store to putting gas in the family car. In order to ensure both consumer confidence and uniformity in commerce, the accuracy of the devices used in those measurements must be tested at regular intervals. The degree of accuracy achieved, in turn, ultimately depends on the competence of the metrologists who calibrate over 350,000 measurement standards per year that are then used by weights and measures officials when testing measuring instruments.



Val Miller demonstrates a volume gauge.

Training and evaluating those personnel is the year-round responsibility of PML's Office of Weights and Measures (OWM), and nationwide the demonstrated abilities of lab staff are trending upward. OWM has just compiled its summary training and proficiency-test data for 2013, which show the highest overall success rate on proficiency testing since the program began collecting data in 2006: 98.97 % now, versus 92.76 % seven years ago.

That improvement is directly tied to OWM's recent efforts. "All persons who work in a standards lab must be able to demonstrate proficiency in order for their labs to be recognized by NIST," says Georgia Harris of OWM's Laboratory Metrology Program. "Each of the 45 or 46 active labs\* is recognized with a certificate of measurement traceability to support their state legal requirements; they may also be accredited by NVLAP. When we issue a certificate, the facility, equipment, staff, standards, procedures – the whole system – is examined against international standards. A very big part of that process is training and proficiency testing (PT)."

A big part indeed. In 2013, OWM staff and highly trained volunteer instructors trained 446 students in seminars, 110 students in webinars, and 55 students in workshops for a total of 633 students. In addition, there were 14 proficiency tests conducted in conjunction with several of America's six Regional Measurement Assurance Programs (RMAPs). Proficiency tests averaged 20 participants, each of whom took measurements of 10 different items, for almost 3,700 points of possible pass or failure.

Many factors have contributed to the rising PT success rate. "For one thing, we completely re-designed all our training courses over the past three years," Harris says, "emphasizing adult-learning concepts and ensuring that the training is activity-based and hands-on.\*\* Now when participants come in to our seminar on mass measurement, we issue them a test-weight kit on the first day, and they have to submit comprehensive calibration certificates on their measurements of those artifacts at the end of the two-week course. There's no way to put it off or get more time."



Georgia Harris with a mass scale.

In addition, OWM has implemented a dynamic assessment scheme to respond to changes in student needs. "When we see an area develop a significant failure rate in an area of PT testing, we target it for more training in subsequent years," Harris says. "In the volume-measurement category, for example, we started observing too many failures, so we began providing additional training for three consecutive years." The numbers tell the story: In 2011, only 62 % of participants successfully passed the volume-measurement PT; this year it was 89 %.

## Calendar 2014

Registration for training in the NIST Office of Weights and Measures is handled by Yvonne Branden at [yvonne.branden@nist.gov](mailto:yvonne.branden@nist.gov).

Course descriptions can be viewed on the Office of Weights and Measures website at <http://www.nist.gov/pml/wmd/calendar.cfm> and clicking on the name of the course.

May 5 - 8 (4 days)  
 Northeastern Weights and Measures Association (NEWMA) - Annual Meeting  
 Manchester, NH  
 Contact: James Cassidy at [jcassidy@cambridgema.gov](mailto:jcassidy@cambridgema.gov)

May 7  
 NIST Training at the Northeastern Weights and Measures Association (NEWMA) Annual Meeting  
 Evaluating Performance, Learning Objectives, and Training Effectiveness for Managers  
 Class No. 5308  
 Manchester, NH

May 19 - 22 (4 days)  
 Central Weights and Measures Association (CWMA) Annual Meeting  
 St. Louis, MO  
 Contact: Sherry Turvey at [sherry.turvey@kda.ks.gov](mailto:sherry.turvey@kda.ks.gov)

May 22  
 NIST Training at the Central Weights and Measures Association (CWMA) Annual Meeting  
 Evaluating Performance, Learning Objectives, and Training Effectiveness for Managers  
 Class No. 5310  
 St. Louis, MO

June 2  
 Webinar - NISTIR 6969 - SOP 8, Part 1  
 10:00 a.m. to 12:00 p.m.  
 Class No. 5315

Webinar - Calibration Method Validation  
 2:00 p.m. - 4:00 p.m.  
 Class No. 5317

June 2 - 6 (5 days)  
 Liquefied Petroleum Gas Liquid-Measuring Devices Instructor Training  
 Class No. 5314  
 Las Cruces, NM

June 3  
 Webinar - NISTIR 7383 - SOP 18, Part 1  
 10:00 a.m. - 12:00 p.m.  
 Class No. 5319

(Continued on pg 3)

## HAVE YOU CHECKED OUT THE TRAINING CALENDAR?

About 20 % to 30 % of PT participants are not from state weights and measures labs. They come from the military, DOE national laboratories such as Sandia and Oak Ridge, and industry. Pharmaceutical companies including Abbott Laboratories and Eli Lilly and Company have sent staff.

Similarly, the training program serves a broad community. OWM conducts training sessions both in the field and at a special educational lab on the NIST Gaithersburg, MD campus. "We have the only training facility of its kind in the world," Harris says. "So we also get people from many other countries, including government and industry metrologists from Canada and Mexico."

Training begins with a course in Fundamentals of Metrology. Passing a math exam is now a prerequisite. "Historically, the biggest challenge with our students has been their math skills," says OWM instructor Val Miller. "Many of our students have been out of school for 10 or 15 years and haven't retained those skills. So we used to spend up to a day of remedial math exercises on simple thing like order of operations."

Another area that typically requires review is correct use of units and symbols. "We spend a lot of time on that," Miller says. "If you give a customer a calibration report with an error on it, it's not simply wrong – it compromises trust and ruins your credibility. We start emphasizing that at the first session of our Fundamentals course, and keep it up throughout the program. The calibration certificate that goes out has got to be right."

The entire basic course sequence takes four weeks, with two weeks spent on mass. (Ninety percent of all measurements done by state labs involve mass. Volume measurement makes up another 8.5 %.) In addition, OWM conducts numerous specialty classes, offers webinars to improve skills and methods, and holds training sessions for trainers.

"At the end of the day, our goal is to assure traceability and uniformity in commerce," says Carol Hockert, chief of OWM. "The only way for us to know whether or not our training is truly successful is by evaluating its implementation. Proficiency tests are an excellent way for us to measure success, so we will continue to improve and expand the use of PTs in our program."

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\* With the exceptions of Rhode Island, Delaware, and North Dakota each state has a weights and measures lab. The District of Columbia also closed its laboratory about three years ago. However, Los Angeles County, Puerto Rico, U.S. Virgin Islands, and the U.S. Department of Agriculture, Grain Inspection Packers and Stockyards Administration maintain separate lab operations and are participants in the OWM program. "Active" labs are those which participate in the training, regional measurement assurance program training and proficiency testing, and submit requests for laboratory recognition according to NIST Handbook 143, Program Handbook.

\*\* Last year, OWM was named an "authorized provider" by the International Association for Continuing Education and Training, which certifies that the OWM training program is compliant with internationally accepted standards.

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**The NIST Office of Weights and Measures**

homepage: <http://www.nist.gov/pml/wmd/index.cfm>

June 3  
Webinar - Software Verification and Validation  
2:00 p.m. - 4:00 p.m.  
Class No. 5318

June 4  
Webinar - NISTIR 6969 - SOP 8, Part 2  
2:00 p.m. - 4:00 p.m.  
Class No. 5316

June 5  
Webinar - Conducting an Effective Management Review  
10:00 a.m. - 12:00 p.m.  
Class No. 5321

Webinar - NISTIR 7383 - SOP 18, Part 2  
2:00 p.m. - 4:00 p.m.  
Class No. 5320

June 6  
Webinar - Uncertainty Budgets for SOP 14  
10:00 a.m. - 12:00 p.m.  
Class No. 5322

June 9 - 13 (5 days)  
HB 133, Basic - Checking the Net Contents of Packaged Goods  
Class No. 5304  
Williamston, MI

June 9 - 13 (5 days)  
Laboratory Administration  
Class No. 5291  
NIST/Gaithersburg, MD

June 25 - 26 (2 days)  
HB 130 - Price Verification  
Class No. 5325  
Hartford, CT

July 13 - 17 (5 days)  
National Conference on Weights and Measures - Annual Meeting  
Detroit, MI  
Contact: [info@ncwm.net](mailto:info@ncwm.net)

July 28 - 31 (4 days)  
NCSLI Conference 2014  
Orlando, FL  
Contact: [info@ncsli.org](mailto:info@ncsli.org)

August 11 - 15 (5 days)  
HB 133, Basic - Checking the Net Contents of Packaged Goods  
Class No. 5313  
Little Rock, AR

August 14  
Webinar - Calibration Certificate Evaluation  
2:00 p.m. - 4 p.m.  
Class No. 5292

August 18 - 22 (5 days)  
Volume Metrology Seminar  
Class No. 5293 - NIST/Gaithersburg, MD  
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Among its many activities, PML's Office of Weights and Measures conducts training classes for trainers.

## LAST CHANCE NIST TRAINING

### AT CWMA--EVALUATING PERFORMANCE, LEARNING OBJECTIVES AND TRAINING EFFECTIVENESS FOR MANAGERS

**WHEN:** Thursday, May 22, 2014; 10:00 a.m. to 3:00 p.m.

**WHERE:** CWMA Meeting, St. Louis Missouri

**CLASS No.:** 5310

**REGISTRATION DEADLINE:** Friday, May 2, 2014

**REGISTER HERE:** <https://tsapps.nist.gov/WMD/>

**ADDITIONAL INFORMATION HERE:** <http://www.nist.gov/pml/wmd/5310.cfm>

**Purpose:** This half day session will explore the role of the manager in ensuring effective training and implementation on the job for performance improvements.

**Learning Objectives:** At the end of this half day session, using notes, provided resources, and insights from other participants in the class, participants will be able to:

- Clarify your role as a manager in ensuring successful and effective application of employee training;
- Evaluate and match learning objectives to employee performance requirements;
- Identify and evaluate tools for evaluating the effectiveness of staff training; and
- Identify applicable methods to assess student learning after the training event."

**Audience:** Training managers and supervisors who want to evaluate training effectiveness.

**NIST Database Contact:** Isabel Chavez at [isabel.chavez@nist.gov](mailto:isabel.chavez@nist.gov), (301) 975-2128

August 20 - 21 (2 days)  
NTEP Grain Analyzer Sector Meeting  
Kansas City, MO  
Contact: [info@ncwm.net](mailto:info@ncwm.net)

August 21  
Webinar - Contract Review  
2:00 p.m. - 4 p.m.  
Class No. 5301

August 26 - 28 (3 days)  
NTEP Joint Meeting of:  
Weighing Sector (Aug. 26 - 27) (2 days)  
& Software Sector (Aug. 27 - 28) (2 days)  
Atlanta, GA  
Contact: [info@ncwm.net](mailto:info@ncwm.net)

August 28  
Webinar - Document Control and Record Keeping  
2:00 p.m. - 4 00 p.m.  
Class No. 5299

September 8 - 11  
Central Weights and Measures Association (CWMA) Interim Meeting  
St. Charles, Missouri  
Contact: [info@ncwm.net](mailto:info@ncwm.net)

September 8 - 19 (2 weeks)  
Mass Metrology Seminar  
Class No. 5297  
NIST/Gaithersburg, MD

September 14 - 18 (5 days)  
Western Weights and Measures Association (WWMA) Annual Meeting  
Portland, OR  
Contact: Brett Saum at [bsaum@co.slo.ca.us](mailto:bsaum@co.slo.ca.us)

NIST Training at the Western Weights and Measures Association (WWMA) Annual Meeting  
Evaluating Performance, Learning Objectives, and Training Effectiveness for Managers  
Class No. 5328  
Portland, OR

October 4 - 8 (5 days)  
Southern Weights and Measures Association (SWMA) Annual Meeting  
Raleigh, NC  
Contact: [info@ncwm.net](mailto:info@ncwm.net)

October 5  
NIST Training at the Southern Weights and Measures Association (SWMA) Annual Meeting  
Evaluating Performance, Learning Objectives, and Training Effectiveness for Managers  
Class # 5327  
Raleigh, NC

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**REMINDER**  
**THE 99TH NATIONAL CONFERENCE ON**  
**WEIGHTS AND MEASURES**  
**ANNUAL MEETING**  
**July 13 - 17, 2014**

The 2014 Annual Meeting will take place in Detroit, Michigan. Early Bird registration closes June 20, 2014. Information can be obtained on the NCWM website at <http://www.ncwm.net>. Register today and share your valuable experience and knowledge with the membership. Federal, state, county, and industry participation is welcome.

Contact: (402) 343-4880 or [info@ncwm.net](mailto:info@ncwm.net)

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elect your own officers, and carry on these annual meetings in a manner independent of the Bureau, just as any scientific organization would. The first thing in order, therefore, will be the perfecting of the organization. I would suggest that this be made the first business of the meeting. After that I would be pleased to say a few words in regard to uniform laws and some other matters in connection with our work. . . .Remarks on the proposition to form a permanent organization are now in order.”

The meeting began with discussions of the “number and character” of the offices to be contained within this organization. The first mentioned were those positions of chairman, secretary, board, and executive committee. The participants began hashing out what would develop into today’s organization, but even with this daunting task ahead of them, the big concern and prime objective of the meeting was to put in place uniform laws for all the states and uniform methods of inspection. This led to a question from Mr. John Richardson (Virginia), “Would it not also be wise to petition Congress to pass uniform laws, and make suggestions as to what we would like.”

Discussions circled back around to the establishment of the organization, what to call it, who would be the chairman, and who would be the correct people to represent the various states. Many possibilities were put forth; however, it was agreed that the Bureau of Standards should take the lead. So the attendees continued to work on fleshing out this new organization. More can be read on this second meeting in the *Report of the Second Conference on Weights and Measures* meeting.

*Linda Crown, Editor*

**NOW AVAILABLE ONLINE**  
**THE REPORT OF THE 98TH NATIONAL CONFERENCE ON WEIGHTS**  
**AND MEASURES (2013)**

<http://www.nist.gov/pml/wmd/pubs/sp1171.cfm>

October 7 - 9 (3 days)  
 NTEP Measuring Sector Meeting  
 Raleigh, NC  
 Contact: [info@ncwm.net](mailto:info@ncwm.net)

October 15 - 16 (2 days)  
 Northeastern Weights and Measures Association (NEWMA) Interim Meeting  
 TBD  
 Contact: [info@ncwm.net](mailto:info@ncwm.net)

October 19 - 23 (5 days)  
 Combined Regional Measurement Assurance Program\*  
 Class No. 5157  
 St. Louis, MO

October 22 - 24 (3 days)  
 HB 130 - Packaging and Labeling  
 Class No. 5323  
 Fort Worth, TX

November 3 - 7 (5 days)  
 Fundamentals of Metrology  
 Class No. 5309  
 NIST/Gaithersburg, MD

November 4 - 7 (4 days)  
 HB 130 - Packing and Labeling  
 Class No. 5324  
 Lake Mary, FL

**2015**

January 18 - 21  
 National Conference on Weights and Measures Interim Meeting  
 Daytona Beach, FL  
 Contact: [info@ncwm.net](mailto:info@ncwm.net)

January 26 - 30 (5 days)  
 Fundamentals of Metrology  
 Class No. 5329  
 NIST/Gaithersburg, MD

February 12  
 Webinar - Conducting an Effective Management Review  
 2:00 p.m. to 4:00 p.m.  
 Class No. 5295

February 26  
 Webinar - Internal Auditing Best Practices  
 2:00 p.m. to 4:00 p.m.  
 Class No. 5296

\*Invitation Only  
 \*\*Limited to State Laboratory Program Participants

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