

President's Address

National Institute of Standards and Technology

Portland, Maine

July 17, 2012

Dr. Willie E. May

Associate Director for Laboratory Programs/Principal Deputy

Thank you, Carol and good morning all.

I'd like to thank Commissioner Whitcomb, the State of Maine, and the people of Portland for hosting this wonderful Conference.

I'd also like to thank Chairman Floren and Don Onwiler of the National Conference on Weights and Measures (NCWM) for inviting me to speak this morning on behalf of the National Institute of Standards and Technology (NIST) Director, Pat Gallagher. I'm truly honored to be here.

I am the Associate Director of Laboratory Programs and also serve as Principal Deputy to the NIST Director. Prior to my current position, I served as Founding Director of the NIST Material Measurement Laboratory, Chemical Science and Technology Laboratory, and led the Analytical Chemistry Division. In addition to my duties at NIST, I am also Vice President of the International Committee on Weights and Measures (CIPM), and President-Elect of the CIPM's Consultative Committee on Metrology in Chemistry and Biology. Through both my responsibilities with the CIPM and working at NIST for – well a very long time, I am somewhat familiar with the International Organization of Legal Metrology (OIML) and Legal Metrology, but this is really my first formal interaction with the National Conference on Weights and Measures (NCWM).

Slide presentation follows on next page.

National Conference on Weights and Measures

“Taking Measure of Our Worth”

Dr. Willie E. May

Associate Director for Laboratory Programs and Principal Deputy

National Institute of
Standards and Technology

NIST
National Institute of
Standards and Technology

Topics for Discussion

- **Need for “Weights and Measures” throughout the Ages**
- **NIST: Our Mission, Scope of Activities, and New Organizational Structure**
- **NCWM and NIST: Partners in Measurement Service Delivery**
- **Measuring our Worth**

The Need for Metrology: Recognized Through the Ages

Mankind has long recognized the need for measurement science and standards to support construction, manufacturing and trade.

The Need for Metrology: Recognized Through the Ages

The ancient Egyptians were well known for their measurement capabilities

- Standard unit of length - the length of Pharaoh's forearm plus the width of his palm
 - The Cubit
- The "Royal Cubit Master"
 - Primary standard in granite
- Realization of the Cubit: A stick of wood
 - Working Standard / Comparability
- Re-calibration of cubit stick required on each full moon
 - Calibration / Traceability
 - Severe penalty for non-compliance



Uniformity of length measurement was achieved to a relative accuracy of 0.05% over a distance of 230 meters

In addition to the well known Royal Cubit for length measurement, a host of other accurate measurement standards existed. For example in mass:



Predynastic
Stone mass standard
(5,000 to 7,000 years old)



The Deben,
12g, 27g, 93.3 g
(3,000 to 5,000 years old)

Standards in Medieval Times

“Throughout the realm there shall be the same yard of the same size and it should be of iron”

Assize of Measures, 1196

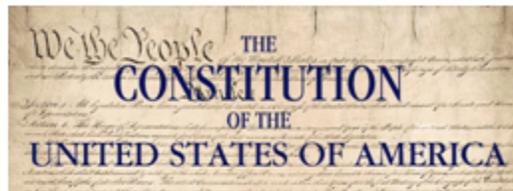


Magna Carta of 1215

“There shall be standard measures of wine, ale, and corn (the London quarter), throughout the kingdom. There shall also be a standard width of dyed cloth, russett, and haberject, namely two ells within the selvedges. Weights are to be standardised similarly.”

U.S. Federal Role in Metrology

The Constitution of the United States



Article 1, Section 8: The Congress shall have the power ... to coin money, regulate the value thereof, and of foreign coin ... and fix the standard of weights and measures ... (1788)

“Foreign traders had begun to voice concern that goods might not be assigned a proper quantitative value at American custom-houses and that, as a result, assessed duties might be unfair and uneven from port to port.”

John Quincy Adams (1817)

International Metrology Infrastructure: The Early Years

International Metrology Infrastructure

20 May 1875

The Meter Convention, an intergovernmental treaty signed by representatives of 17 nations, established an organization structure for member **governments to act in common accord on all matters relating to units of measurement**.

- It established a scientific and permanent International Bureau of Weights and Measures (BIPM) operated under the direction of an International Committee of Weights and Measures (CIPM) controlled by General Conference for Weights and Measures (CGPM).

In subsequent years, National Metrology Institutes were established

1887 PTB (PTR)

“to supervise and direct calibration and to establish metrological standards”

1900 NPL

“for standardising and verifying instruments, for testing materials and for the determination of physical constants”

1901 NIST (NBS)

“for custody of the standards; the comparison of the standards...; the construction ... of standards; the testing and calibration of standard measuring apparatus; solution of problems which arise in connection with standards; the determination of physical constants and the properties of materials ...”

NIST (NBS) established in 1901

“It is therefore the unanimous opinion of your committee that no more essential aid could be given to

- manufacturing
- commerce
- the makers of scientific apparatus
- the scientific work of Government
- schools, colleges, and universities

than by the establishment of the institution proposed in this bill.”



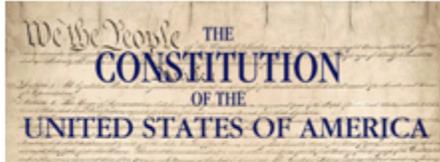
**House Committee on Coinage, Weights and Measures ... on the establishment of the National Bureau of Standards (now NIST)
May 3, 1900**

Organic Act of 1901; Updated in 2008

Functions and activities of the Institute include:

- custody and dissemination of national standards
- determination of physical constants and the properties of materials,
- comparison of US national standards with those of other nations
- solutions to measurement and standards problems of other government agencies
- providing (Innovation) assistance to industry

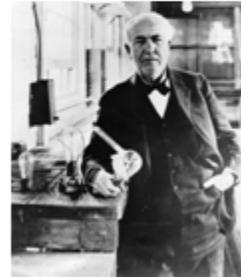
Needs for Measurement Standards in the U.S.



Article I, Section 8: The Congress shall have the power to...*fix the standard of weights and measures*

National Bureau of Standards established by Congress in 1901

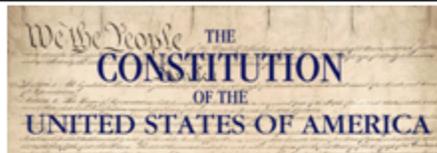
- Eight different “authoritative” values for the gallon
- Electrical industry needed standards
- American instruments sent abroad for calibration
- Consumer products and construction materials uneven in quality and unreliable



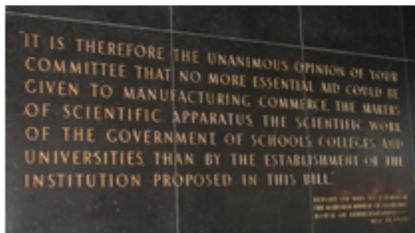
Currently, it is estimated that 80% of global merchandise trade is influenced by testing and other measurement-related requirements of regulations and standards

National Institute of Standards and Technology (NIST)

- Non-regulatory agency within U.S. Department of Commerce
- Founded in 1901 as National Bureau of Standards



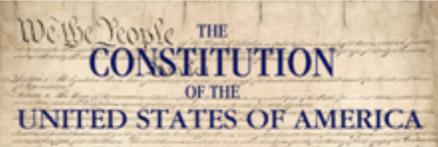
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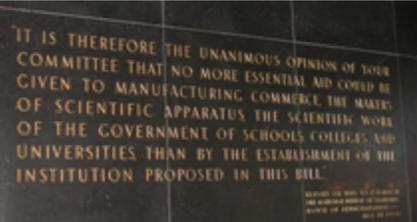
Unique Mission within the Federal Government ...
to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life

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Article I, Section 8: The Congress shall have the power to ...*coin money, regulate the value thereof, and of foreign coin and fix the standard of weights and measures*



- **Deep research expertise underpins technological innovation** – e.g., new materials, advanced clinical diagnostics and therapies, advanced communications, etc.
- **Non-regulatory status** enables important role as a convener that facilitates collaboration between industry and government

NIST-at-a-Glance

Major Programs

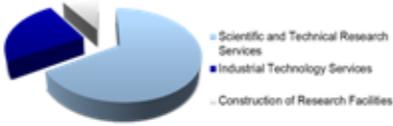
- NIST Laboratories
- Baldrige Performance Excellence Program
- Hollings Manufacturing Extension Partnership

Major Assets

- ~ 3,000 employees
- ~ 2,800 associates and facilities users
- ~ 1,600 field staff in partner organizations
- ~ 400 NIST staff on ~1,000 national and international standards committees

NIST FY 2012 Congressional Appropriations

\$750M



Plus
~ \$100 M from other Government Agencies
~ \$50 M for other reimbursable services

NIST has two main campuses.....



Gaithersburg, MD

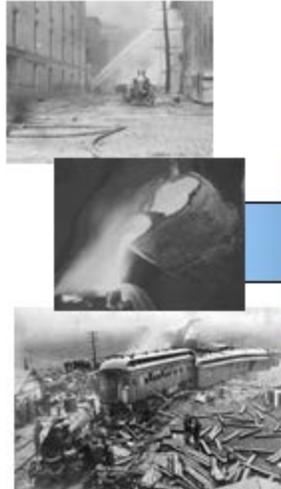
and four joint institutes

- JILA – applied physics
- JQI – quantum science
- IBBR – biotech
- HML – marine science



Boulder, CO

Since our inception, in addition to maintaining the more traditional National Physical Standards, we have also focused a significant portion of our research and measurement services activities on addressing contemporary societal needs.

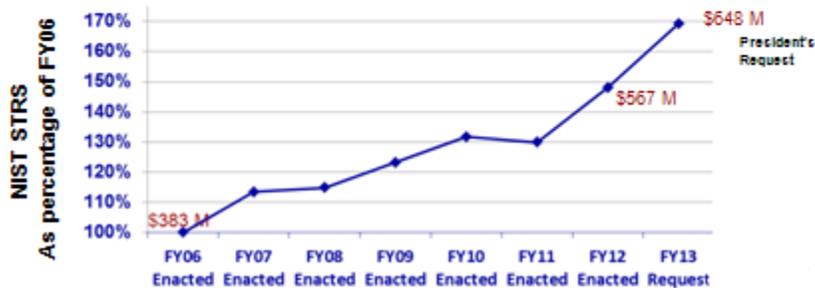


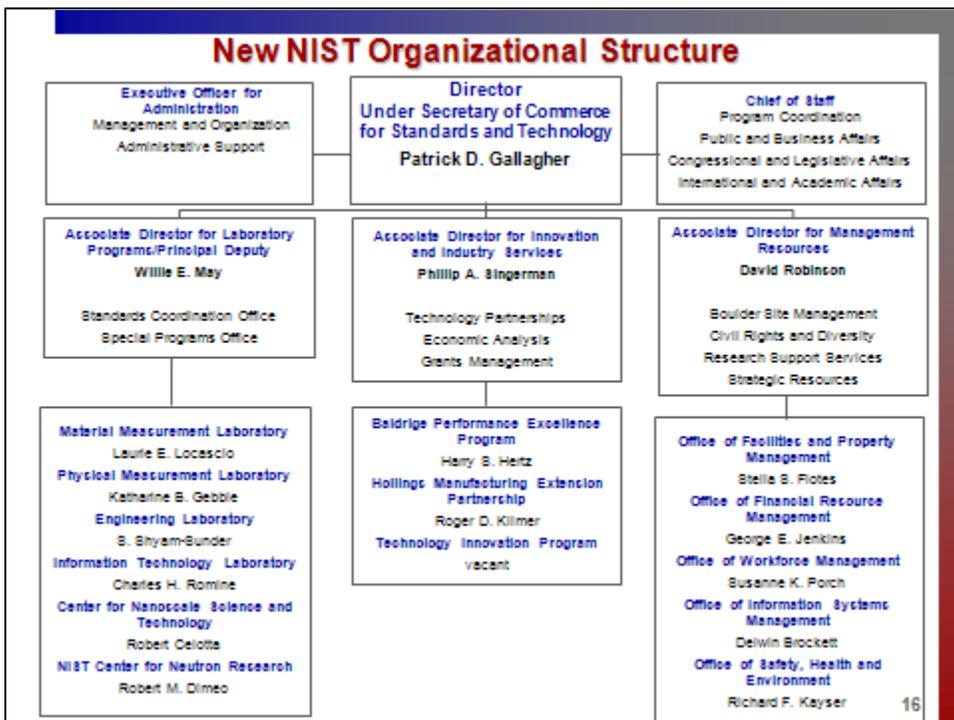
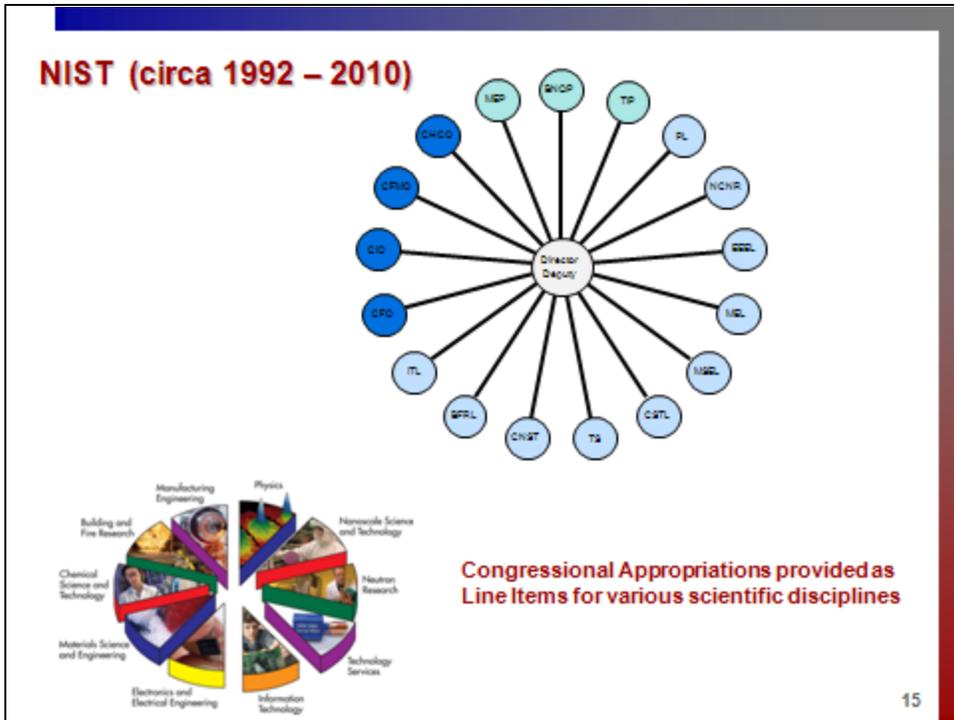
NIST Strategic Investment Priorities

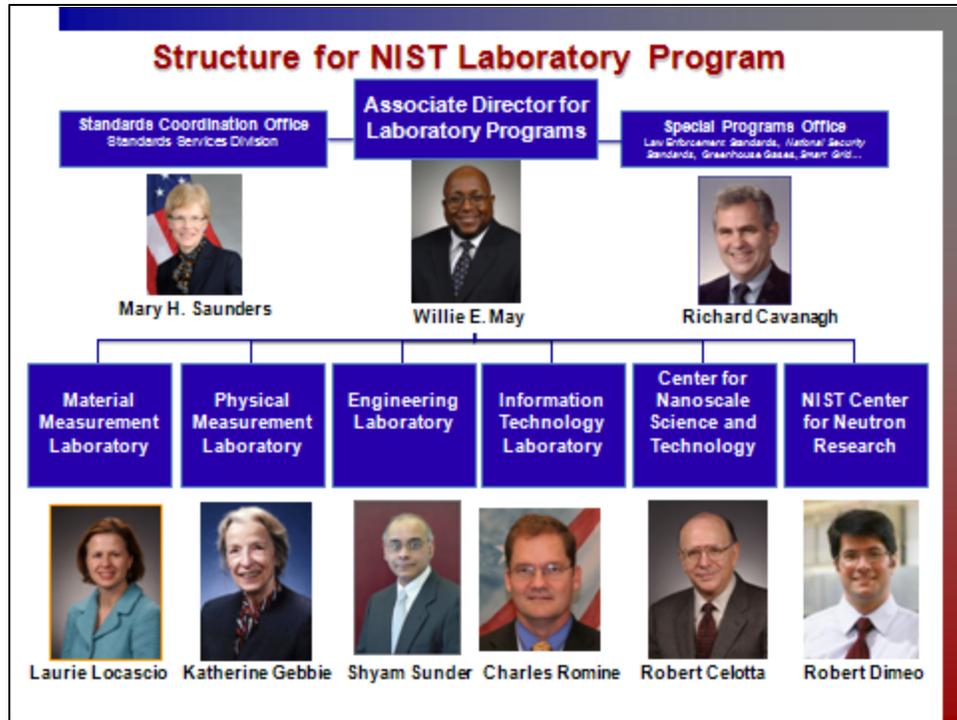
- Advanced Manufacturing
- Advanced Materials
- the Environment and Consumer Safety
- Energy
- Bioscience and Health
- Information Technology & Cybersecurity
- Physical Infrastructure
- Forensics & Homeland Security

U.S. Innovation Agenda – NIST has an increasing role

Both the **American Competitiveness Initiative** & the **America COMPETES Act** called for substantially increased funding for NIST laboratory Programs







NIST Metrology Laboratories

Responsible for advancing the state-of-the-art for measurement science and the dissemination of this metrology into industry, other government agencies, and academia.

- The Physical Measurement Laboratory (PML)** develops and disseminates the national standards of length, mass, force and shock, acceleration, time and frequency, electricity, temperature, humidity, pressure and vacuum, liquid and gas flow, and electromagnetic, acoustic, ultrasonic, and ionizing radiation through activities ranging from fundamental measurement research to provision of measurement services, including calibration services, standards, and data. Houses NIST Office of Weights and Measures
- The Material Measurement Laboratory (MML)** serves as the national reference laboratory for measurements in the chemical, biological, and material sciences through activities ranging from fundamental and applied research, to the development and dissemination of certified reference materials, critically evaluated data, and other programs/tools to assure the quality of measurement results. Houses NIST SRM and SRD Programs

Definition of the kilogram

3rd CGPM, 1901 :
 “The kilogram is the unit of mass;
 it is equal to the mass of the
 international prototype of the
 kilogram.”



New York Times
 (27 May 2003)

**Scientists Struggling
 to Make the Kilogram Right Again**

...The kilogram is getting lighter, scientists say,
 sowing potential confusion over a range of scientific
 endeavor...

International Bureau of Weights and Measures

8



Electronic Kilogram

Leading the Way to Replace the World’s Last Artifact Standard

Kilogram unit now ...
 • 120 year-old artifact

Alternative e-Kilogram

- Mass derived from atomic second, laser meter, Josephson volt, quantum Hall ohm
- **Equivalent to measuring Planck’s constant**
- NIST value with 32 ppb uncertainty is best in the world (goal 20 ppb)
- Need confirmation from rest of world

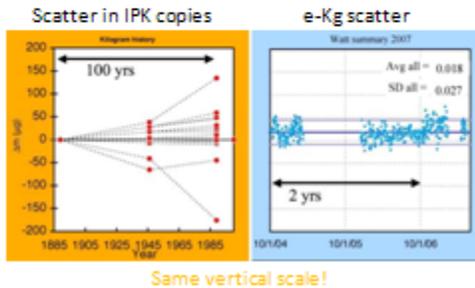


Ultimate Goal

- redefined kg unit in terms of invariant quantum standards

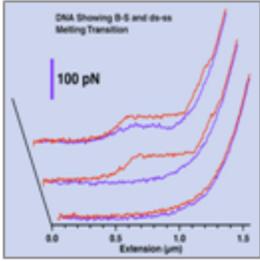
Why?

- Reduced uncertainties of many fundamental constants
- Reduced uncertainties of electrical quantities and the practical realizations become part of the SI
- Invariance in time and space
- The SI becomes more accessible at the highest level of accuracy

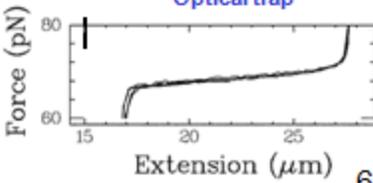


DNA as an Intrinsic Force Standard

AFM



Optical trap



65 pN

- DNA can be manufactured to atomic precision anywhere in the world.
- The force required to induce DNA transition is used as a biophysics "standard" – but firm metrological basis does not exist
- NIST is working to measure the DNA transition force with traceable metrology using approaches based on both optical and AFM techniques.



Electronic kilogram project

Mass is the only SI unit still defined by a physical artifact

- NIST and other national labs are working to redefine in terms of natural phenomena
- Watt balance—compares precise measure of voltage and resistance with force and velocity
- Int. Gen. Com Weights and Measures has recommended redefinition
- Could improve some electrical measurements 50 fold



© NIST
11/10/10

NIST Technology Laboratories

Responsible for sector-specific programs in technology and technology infrastructure

- **The Engineering Laboratory (EL)** promotes the development and dissemination of advanced manufacturing and construction technologies, guidelines and services to the U.S. manufacturing and construction industries through activities, including measurement science research, development of performance metrics, tools and methodologies for engineering applications, and supporting standards and codes development.
- The EL has specific responsibilities in
 - fire prevention and control;
 - national earthquake hazards reduction;
 - national windstorm impact reduction;
 - national construction safety.
- **The Information Technology Laboratory (ITL)** develops and disseminates standards, measurements, and testing for interoperability, security, usability, and reliability of information systems, including cybersecurity standards and guidelines for Federal agencies and U.S. industry, supporting these and measurement science at NIST through fundamental and applied research in computer science, mathematics and statistics.



Healthcare reform is a major issue throughout the world

- The rising cost of healthcare and increased prevalence of chronic diseases is having a devastating affect of economic security and quality of life in all parts of the world.
- Major efforts are underway to reform healthcare and reduce spending through increased efficiency and quality, focusing on prevention of disease and creating a healthier population.

It is a stated goal of the Obama Administration to improve the quality of U.S. health care while lowering its cost by computerizing all Americans' medical records. ... "this will cut waste, eliminate red tape, and reduce the need to repeat expensive medical tests it will save lives by reducing the deadly but preventable medical errors that pervade our health care system".

- **Need interoperable health IT network that is correct, complete, secure, usable, and testable**
- **Measurements that are comparable over space and time are key to achieving these goals.**

Healthcare: Lack of Standards has Economic and Quality-of-Life Implications

U.S. Spends ~ \$2.5 trillion on Health Care Annually of which 10-15% is associated with measurements

- ~ 70% of health care decisions are based on results from clinical laboratory measurements
 - Yet, standards exist for only 10% of the 700 routinely performed clinical laboratory tests
- 60 million CT tests performed annually to measure changes in lesions are limited by ability to discern only large changes in size/metabolism
 - This is a direct consequence to lack of standards to monitor equipment performance
- Costs of repeat measurements amounts to 1.5 B US\$ per year in Germany according to the German Health Report of 1998 (www.qbe-bund.de)

Measurement Bias also Affects Quality of Life and leads to

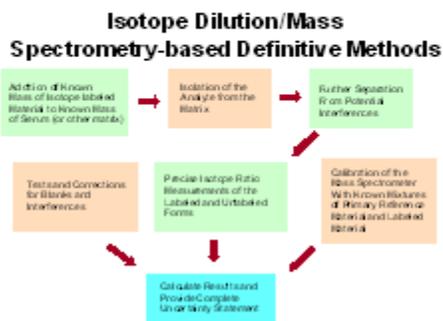
- Incorrect diagnosis and treatment
- Impairment of patient well-being

NIST has maintained Standards for 13+ Health Status Markers for 25+ years

Reference Systems are Currently in Place for Many Well-Defined Markers that are:

- Relatively small well-defined molecular or elemental species
- Typically, can be determined using isotope-dilution GC or ICPID/MS-based methodologies

Marker	Disease State
Calcium	Cancer, Blood Clotting
Chloride	Kidney Function
Cholesterol	Heart Disease
Creatinine	Kidney Function
Glucose	Diabetes
Lithium	Antipsychotic Treatment
Magnesium	Heart Disease
Potassium	Electrolyte Balance
Sodium	Electrolyte Balance
Triglycerides	Heart Disease
Urea	Kidney Function
Uric Acid	Gout
Vitamins	Nutrition Status



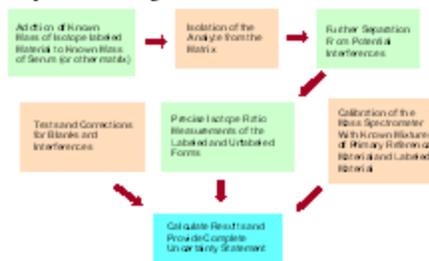
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Uric Acid	Gout
Vitamins	Nutrition Status

Isotope Dilution/Mass Spectrometry-based Definitive Methods



The New York Times “Quest Acknowledges Errors in Vitamin D Tests”



“The nation’s largest medical laboratory company provided possibly erroneous results to thousands of people who had their vitamin D levels tested in the last two years, the company has acknowledged.”
“When the Quest tests have been inaccurate, the reading has typically been too high, although not in all cases.”
By ANDREW POLLACK, *NY Times*, JANUARY 7, 2009

NIST SRM 972 - Vitamin D in Human Serum



- Vitamin D deficiency has long been associated with osteoporosis and an increased risk of bone fractures; has recently been linked to increased risk of other common diseases.
- Clinical labs perform hundreds of thousands of tests for vitamin D each year, and recent studies have shown that different labs often provide different results for the same samples.
- MML scientists have developed SRM 972, “Vitamin D in Human Serum,” to provide a foundation for increased accuracy for vitamin D measurements
- SRM 972, issued 9 Jun 2009, contains four serum samples with NIST assigned values for three vitamin D metabolites: 25(OH)D₂, 25(OH)D₃, and 3-epi-25(OH)D₃

>1300 units sold over past 21 months

Major purchasers: Quest Diagnostics (666); Perkin Elmer (97); Kaiser Permanente (12); Vanderbilt University (11); CDC (9); Waters Instruments (9)

Laboratory Medicine: NIST Program Expansion Plans

Reference systems for markers that typically exhibit:

- High molecular mass (>20,000 daltons)
- Heterogeneity, low concentration, instability of analyte form
- Cannot all be determined using GC- ID/MS or ICP/MS-based methodologies
- Such as the following:

Protein Analysis

- Single Blood Protein Biomarkers
 - **Troponin-I** **Myocardial Infarction**
 - C-Reactive Protein *Risk of Heart Attack*
 - **PSA** **Prostate Cancer**
 - Albumin *Kidney Function*

Genetic Testing

- Single Gene Mutations
 - Genetics Directed Therapy
 - **Her2-Nu** **Breast cancer**
 - CYP2C9 and VKORC1 *Warfarin Dosage*
 - Kras *Colon Cancer*
 - Diagnostics
 - DNA Triplet Repeat *Fragile X*
 - CAG Repeats *Huntington’s Disease*
- Genome Sequencing to support Direct to Consumer Genetic Testing

Glycated Hemoglobin
100 kDa
 2.5 x 10⁵ molecules

28

Cardiac Troponin I

- Cardiac Troponin I is a heart muscle protein that is observed in the bloodstream after myocardial damage
- **Measurement Challenges:**
 - Low levels of detection needed: 0.1 - 20 ng/mL
 - Heterogeneity of troponin forms (phosphorylation, complexation with other troponin subunits, degradation in serum)
- EKGs often do not show evidence of heart damage
- Damage to heart tissue is accompanied by a rise in blood levels of certain proteins
 - CK-MB not specific to heart tissue
 - Troponin I specific to heart tissue
- Immunoassay-based methods are used to measure blood troponin levels
- Results among various immunoassays vary by more than 20-fold on **same** blood sample

Assay Manufacturer	Conc. ng/mL	# Labs
A	19.9	115
B	6.7	489
C	0.85	27

From G. S. Bodor, Denver Health and Hospitals -- personal communication 1987

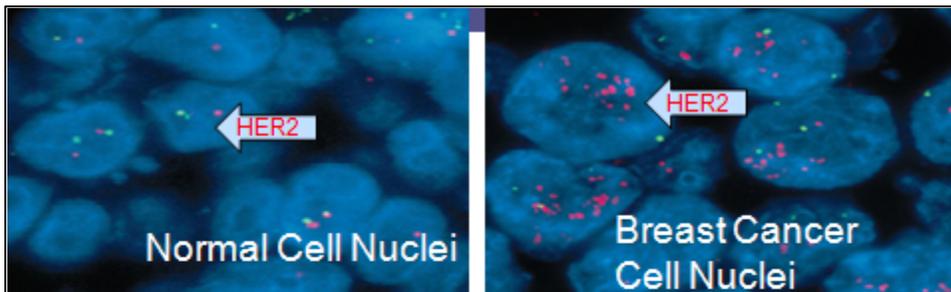
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Prostate Specific Antigen (PSA)

- >37,000 deaths annually in U.S. from prostate cancer
- Blood tests for PSA are used to screen for the likelihood of prostate cancer
- PSA is a heterogeneous protein that occurs both free and complexed
- Immunoassays are the approach favored for routine measurement of PSA
- **Wide variability among the results from immunoassays (see below)**
- **High incidence of false positives and false negatives**

# of Labs	- Low -	- Med -	- High -	- Mean -	- S.D. -	%RSD	95% Confidence Range
2672	10.8	19.4	34.5	19.87	2.14	10.9	15.39-23.95
2653	7.2	9.8	18	9.92	1.11	11.2	7.70-12.14
2689	5.3	7.3	12.8	7.36	0.79	10.7	5.78-8.94
2509	2.1	3	4.7	3.03	0.33	10.8	2.37-3.69
2504	0.6	0.7	1.5	0.73	0.11	14.5	0.51-0.95
2591	0.1	0.2	0.8	0.24	0.1	40.2	0.04-0.44

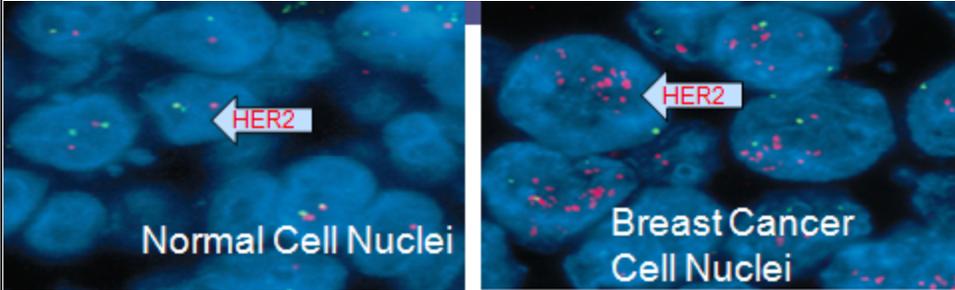
From: <http://www.cooleyville.com/cancer/capsava.htm>



"The College of American Pathologists and the American Society of Clinical Oncology, which issued guidelines for the HER-2 estimated that around 40% of HER-2 testing may be inaccurate" (20% false positive; 20% false negative)



<http://online.wsj.com/article/SB119941325367266813.html>



Normal Cell Nuclei

Breast Cancer Cell Nuclei

“The College of American Pathologists and the American Society of Clinical Oncology, which issued guidelines for the HER-2 estimated that around 40% of HER-2 testing may be inaccurate” (20% false positive; 20% false negative)

HER-2 Tests
180,000/year

- False positive** → Get Herceptin unnecessarily
Up to 36,000
 - Expensive
 - Numerous side effects
- False negative** → Herceptin Treatment withheld
Up to 36,000
 - Inappropriate treatment
 - Increased morbidity
 - Increased mortality

<http://online.wsj.com/article/SB119941325367266813.html>

Lack of recognition is a good thing!

The weights and measures system in the U.S. works so well that its accuracy is taken for granted.



It's not always pleasant, but it's fair -- Thanks to your efforts.

Weights and Measures *in the news*



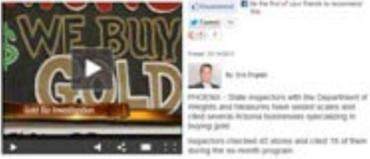
Washington's airport baggage scales calibrate well in WSDA inspection

OLYMPIA – Travelers at Washington's airports have a lot to say about their airport's safety checks on baggage screens that they're happy to see, but being in recent months need to weigh their baggage doesn't cause concern.



Are You Getting Shorted On Heating Oil?

ALBUQUERQUE – Just Check Delivery Trucks



18 gold-buying stores busted in Arizona

PHOENIX – State inspectors with the Department of Weights and Measures have seized orders and shut several Arizona businesses specializing in buying gold.



News4 I-Team: How Accurate are Gas Pumps?

When you fill up your gas tank, how do you know if you're getting a fair amount? News4's I-Team went along with the WSDA Department of Agriculture's "Pump Check" which tested gas pumps at several gas stations around the state. You can watch the video at: [http://www.wsdn.com](#)



Officials Warn of 'Wor' Weight Rip-Off

PHOENIX – State inspectors with the Department of Weights and Measures have seized orders and shut several Arizona businesses specializing in buying gold.



Better Check that Receipt: Study Says You're More Likely Overcharged than Undercharged

The finding is based on 2011 survey data which was released Monday.

Getting the word out

Your communities and the next generation of consumers are depending on you for guidance – and protection !!!



... and We're Here to Help !!!

NIST is ramping up its training efforts

- \$0.5M toward new training programs
- 20 new regional instructors to train 3,000 inspectors nationwide
- New hands-on and online courses, webinars for those who need training on a tight budget



A challenge to you

The foundation of all knowledge is accurate data.

- NIST and NCWM need your help to collect performance and impact data.
- We need you to be our boots on the ground.
- Let's work together to define a methodology for data collection.
- With the right data, we can do the analysis needed to truly PROVE the WORTH of your efforts to our communities and economy.



NIST: A Premier Scientific Institution

World-leading measurement science and standards program

- 3 Nobel Laureates since 1997
- MacArthur Fellowship winner in 2003
- National Medal of Science winners in 1998, 2008
- 60 National Academy Members (8 current)
- ~120 National Society Fellows and recipients of ~ 60 National/International Awards per year



A.V. Astin, Director of NBS (1951 – 1969)
The National Bureau of Standards, Physics Today, June, 1953

"The Bureau staff believes first of all in the importance of scientific research as a means of intellectual and spiritual advancement, as the foundation of our technological economy and high standard of living, and as the bulwark of our national security." "... a substantial portion of the program.. should be devoted to fundamental or nonprogrammatic research... on ideas of their own choosing.."

"... the development and maintenance of the standards ... provides the first and primary reason for the Bureau's existence. ... This standards work must ... keep abreast of the expansion of the frontiers of science...."

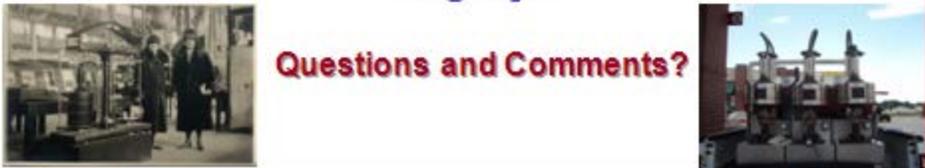


Thanks for Your Attention

Willie E. May
*Associate Director for Laboratory Programs & Principal Deputy
National Institute of Standards and Technology
100 Bureau Drive
Gaithersburg, Maryland 20899-1000*

*(301) 975-2300
wem@nist.gov*

Questions and Comments?



Chairman's Address

National Conference on Weights and Measures

Portland, Maine

July 17, 2012

Kurt E. Floren

Commissioner, Los Angeles County Department of Agriculture

Los Angeles, California

Good morning. First, let me welcome you to the 97th Annual Meeting of the National Conference on Weights and Measures (NCWM). I thank you for the honor of serving as Chairman of NCWM over this past year.

Secondly, let me confess at the outset that I have failed to accomplish anything close to what I had hoped and intended to do in the course of my chairmanship. This year, I had the sincere pleasure of traveling around the country, attending regional meetings and observing the great work of so many dedicated Weights and Measures officials, Associate Members, and interested parties from around the states. At each, I found myself doing something of an apology tour, expressing frustration and regret at the lack of progress in producing final work products in keeping with my theme for the year, "Taking Measure of Our Worth."

As I know I am not alone, this has been an indescribably challenging year, scrambling to retain support and funding for the very important work that we all do in a horrific economic environment. As I commented in my last newsletter article, I am so very proud of what we do. I highlighted the mottos that appear on the NCWM Website: "Creating Confidence – Ensuring Equity"; "Giving A Voice To All"; "The Standard for Fairness in the Marketplace."

I have always been astounded at the array of topics and issues dealt with in the work of the Conference. The agendas with which we are dealing this week are no exception, from railway track scale and retail motor fuel dispenser issues to polyethylene products, hydrogen fuel, and, of all things, animal bedding. It really is astounding – and sobering. What weights and measures regulatory and standards issues touch upon also touch virtually every consumer in this country and beyond every single day. That makes what we strive to do of tremendous worth and importance, not just in our governmental, manufacturing, and marketing worlds, but to every citizen in every community.

NCWM has accomplished a great deal over recent years. There is a temptation, as Chairman, to focus on and highlight what has been occurring in the last 12 months. But, it is important to consider things from a long-term perspective, in reverse and in moving forward. Looking back, to the credit of so many of you and of the great leadership provided by our past Chairs and Board members, NCWM has undertaken many major operational reorganizations and service delivery improvements, making it a much stronger and more effective organization:

- Just four years ago, NCWM assumed full management of its operations, including membership, arrangement and conduct of our meetings, hiring of an outstanding Executive Director, and establishment of a permanent home office, achieving fiscal soundness, stability, and organizational effectiveness not before enjoyed.
- Enactment of the Verified Conformity Assessment Program (VCAP) has accomplished great steps toward ensuring that load cell and, soon, other device manufacturing processes of those holding certificates of conformance result in uniformity and consistency in production, lending assurance and verification to quality and production-meets-type requirements.
- We have implemented the On-Line Position Forum, providing a great means to expand and enhance opportunities for members to actively participate in the development of standards, whether or not able to physically attend our meetings. The Forum is receiving increased attention and utilization, and enhancements continue to be identified to make it more user-friendly and functional.

- The National Certification Program has been launched, with the work of the Professional Development Committee, our contractor and old friend Ross Andersen, and the many subject matter experts from among our members and their staffs teaming to continue development of exams to cover the broad spectrum of weights and measures disciplines. These certifications will serve to demonstrate and document the knowledge and competence of inspectors and ensure uniformity of skills and abilities in our system.
- Strategic Planning has been fully incorporated, not in the form of a dusty document turning yellow on a shelf, but a living document that is continually assessed, updated, and employed, with clear goals and strategies to enhance NCWM as a national and international resource, to provide ongoing and improved training opportunities for members, to improve the National Type Evaluation Program, and to secure the financial stability of the Conference.

The list goes on. And so does the work in continuing to build upon these achievements and derive ever-increasing returns from them. These represent the visions of many among us and, particularly, the endeavors of preceding NCWM Chairs and Boards of Directors who deserve great admiration for that forward vision. All of this and more has been done while fulfilling our core work in developing the standards and procedures that fill our handbooks and provide the assurance of equity in the marketplace, to which NCWM is dedicated.

All that I have mentioned are works in progress. None are complete, but, rather, are incredibly valuable undertakings that will and must continue to develop to produce their full potential in benefits for us all. This brings me back to my confession of not having fulfilled all that was my vision under our year’s theme, “Taking Measure of Our Worth.”

Back home in California, to say that things have been “challenging” would be a gross understatement. We, like so many states, have been dealing with continually declining resources and endless streams of threats to our programs. Our State Department of Food and Agriculture, within which resides our State Weights and Measures agency, Division of Measurement Standards, lost over \$33 million in general fund support – 35 % of its budget – over the last year and a half. Program reductions have been widespread, not the least of which was utter decimation of all general fund support to Division of Measurement Standards, excepting only minimal funding of its metrology laboratory, upon which local jurisdictions rely for standards calibrations. In May, even that was significantly reduced due to continuing State revenue shortfalls.

To add to this, multiple legislative bills seeking to exempt certain industry sectors from all weights and measures regulatory oversight had to be addressed, as did the impending sunset of a statute authorizing County Sealers to charge device registration fees, the core support mechanism for local device inspection programs. As Agricultural Commissioner/Sealer of our state’s largest jurisdiction and Vice-President of our statewide organization of Commissioners/Sealers, the call to action for self-preservation did severely frustrate advancements in formulating National Weights and Measures support strategies that I had envisioned in my role as your Chairman.

However, crisis often stimulates ingenuity, and I want to share some positive outcomes of these intense struggles. In addressing these fiscal challenges, representatives of industries affected by many threatened programs were brought together, teaming with regulators to examine program activities and identify least destructive approaches to reductions. Mutual objectives and concerns were considered and discussions of program values were undertaken in developing strategies to deal with funding issues. In every case, reliable, detailed data proved critical in reaching agreement in ranking program priorities and making sound decisions.

In the case of our device registration fee legislation, we benefited from a decades-long practice of our State Division of Measurement Standards in collecting and compiling statewide device inspection testing, compliance, and expenditure data. Each County Sealer reports monthly inspection results for 29 specific categories of devices, recording pass/fail rates and hours expended for each. Year-end financial reports collected from all jurisdictions enable extrapolation of actual program costs. In negotiating with industry groups and legislators over recent months, this detailed information provided convincing evidence of the need for these regulatory activities and the actual costs of delivering the valuable consumer and competitor protection services. In negotiating with one industry sector originally seeking an outright exemption from all inspections and from registration fee requirements, the data we were able to produce served to demonstrate the value of regulatory inspections to them in securing fair competition and, in the end, solicited not only agreement on a fee structure, but a “support” position from them on the bill. As a final result, our device registration bill, even in these times of extreme economic pressure, is moving forward with revenue increases exceeding \$2 million toward enhancements of local Weights and Measures activities.

As to the State Weights and Measures funding dilemma, this same data served to convince legislators of the importance of State oversight, coordination, and training in support of local jurisdictions and facilitated development of State administrative fees that County Sealers, under newly-established statutory and regulation authorities, are now collecting through our device registration billings and remitting to the State Division of Measurement Standards to sustain its device program work.

Finally, other innovative ideas have been implemented, including securing monies in the form of *cy pres* awards in settlements of civil prosecutions brought jointly by the County and State Weights and Measures agencies against chronic violators. Those funds have been utilized to sustain package inspection and price verification programs at the State level, effectively causing non-compliant entities to carry the costs.

What this exhausting year in my state has produced is a dress rehearsal for what, I believe, must be pursued on a national basis. True teamwork among jurisdictions – State and County – and engagement of industry members, sharing and cooperating in data gathering and presenting a unified picture of the worth of Weights and Measures programs, is proving invaluable in producing innovative funding mechanisms very different from those of the past. We cannot keep doing things as we have always done them.

So, my year as Chairman draws to a close. Has progress been disappointing in taking the measure of our worth nationally? Yes. Is there a declaration of defeat? No. Efforts must continue. I remain committed to continuing the effort and hope we can team together to accomplish far more than any of us can do individually. Like so many major NCWM endeavors, work is ongoing. Full results are not yet realized. But, there is great promise in what can be achieved. I thank you for the honor you have given me this year, and hope that, through teamwork, we can accomplish for years to come much more than what could be done in a single challenging year.

Again, I thank you, sincerely.

Chairman Elect’s Address

National Conference on Weights and Measures

Portland, Maine

July 17, 2012

Stephen Benjamin

North Carolina Department of Agriculture and Consumer Services

Thank you Kurt, good morning everyone and thank you for being here. It is a privilege and honor to have been selected to serve as your Chairman for the coming year. I will be brief as I am about all that stands between you and your trip home.

First of all, I would like to thank all of those that have served on our committees, subcommittees, sectors and task groups this past year, both at the Conference and regional levels. It is your time and dedication to the issues that come before us that make the National Conference on Weights and Measures (NCWM) successful. I would also like to thank my staff for the effort they must put in while I’m fulfilling my duties, first as Chairman-elect and now as Chairman of NCWM. Finally, I would like to thank my family for being supportive of this opportunity.

Speaking of family, we recently went on a family vacation to the Shenandoah Valley area of Virginia, about a five-hour drive from our home. As usual, after about 30 minutes on the road, my six-year old daughter asked the question, “Are we there yet daddy?” Being a patient and loving father, I took a deep breath and went with my second response, “Not yet sweetheart.”

This scene was repeated a number of times during the drive, but I also had time to think, well aware that I had to deliver this speech just a few weeks later. Certainly a lot has gone on over the years in the NCWM, but I asked myself, “Are we there yet?” In considering this, I don’t know if there is a final destination for our organization, but there have definitely been milestones on the journey forward. Some of these milestones have been significant to this organization, such as the transition of NTEP management from NIST, OWM to the Conference, and more recently the transition from Management Solutions to our own Executive Director and staff. Many other milestones are in the form of proposals that come before us, some of them involving a great deal of time and sometimes spirited discussion.

You’ve all heard the cliché, “it’s not about the destination, but the journey.” As an organization we have a goal, “That equity may prevail,” that is the journey we are on. We proceed along this path as new technologies are developed for devices, new fuels are introduced, and new products are marketed and even old products in new packaging. In short, the world of weights and measures is constantly changing, and we must move forward to address these needs through our proposal process.

We have worked these past few years on moving the NCWM forward as an organization as well. How can we do better in promoting what we do and improve at how we do it? At the risk of sounding like a broken record, I think the biggest step recently was the management change we made in 2007. This action provided us a dedicated staff focused on the business of the Conference. It also allowed for funds to pursue projects such as website improvements, online applications and registrations, web posting of training material, and the online position forum. We continued on this path forward as we implemented the Verified Conformity Assessment Program (VCAP), the Professional Certification Program, and the formation of the Packaging and Labeling Subcommittee, which held their first face-to-face meeting this past Sunday.

With this in mind, my theme this coming year is “On the Path to Tomorrow.” I encourage the continued development of projects such as the “tool kit” for weights and measures programs that will put facts, contacts, and materials to support their programs at their fingertips. The Professional Certification Program and VCAP continue to grow and reach more people. The Board of Directors continues to look at ways to increase services to the members in order to make membership meaningful. The key to moving forward is simply your involvement. Many of you may equate involvement with serving on an NCWM standing committee, but I say even participating at a

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Chairman Elect's Address

regional level or on a task group or even replying to a question on a list server is a step on the path. We are working together and sharing our knowledge to move forward.

To this end I make the following appointments for the coming year:

- Laws and Regulations Committee:
Louis Sakin, Towns of Hopkinton/Northbridge, Massachusetts, five year term
- Specifications and Tolerances Committee:
Edward Seidler, Town of Framingham, Massachusetts, five year term
- Professional Development Committee:
Stacy Carlsen, Marin County, California five year term
- Nominating Committee:
Committee Chair, Kurt Floren, Los Angeles County, California
Judy Cardin, Wisconsin
Thomas Geiler, Barnstable Regulatory Services, Massachusetts
Joe Gomez, New Mexico
Maxwell Gray, Florida
Randy Jennings, Tennessee
Tim Tyson, Kansas
- Credentials Committee:
To be announced later.
- Presiding Officers:
Jack Walsh, Town of Wellesley, Massachusetts
John Albert, Missouri
SWMA, to be decided.
WWMA, to be decided.
- Parliamentarian:
Lou Straub, Fairbanks Scales, Inc.
- Chaplain:
Stephen Langford, Cardinal Scale Manufacturing Co.
- Sergeants-at-Arms:
I will be working with our members from Kentucky to designate Sergeants-at-Arms for our 2013 Annual Meeting.

I look forward to seeing you all in Charleston, South Carolina, for the Interim Meeting in January and have a safe trip home.

Thank you.



Pictured: Kurt Floren, NCWM Chairman; Tom Geiler, Award Recipient; and Willie E. Mav. NIST.

Special Recognitions

NCWM Lifetime Achievement Award Recipient

Tom Geiler

Only one NCWM Lifetime Achievement Award may be given each year. The 2012 recipient is Tom Geiler, Director of the Regulatory Services Department of Barnstable, Massachusetts.

Tom began his career as a meat cutter. He must have excelled, because he went on as a meat department manager for 15 years. During this same time, he was also a reserve police officer for his community; a position he would hold for 35 years. In 1974, he took the experience he gained in law enforcement and retail, and applied it to a new line of work as weights and measures sealer. Thirty-eight years later, he still holds that position as well as a few other duties.

In those 38 years, Tom has attended 35 consecutive NCWM Annual Meetings. He has served the Education, Administration, and Consumer Affairs Committee, the Subcommittee on Members Expenses, the Task Force on Planning for the 21st Century, the Laws and Regulations Committee, the Privatization Work Group, the Budget Review Committee, the United States/Canada Mutual Recognition Work Group, the Strategic Planning Subcommittee, the Legislative Liaison Committee, the Finance Committee, and many years on the Nominating Committee. He served twice as a NCWM Vice Chairman, two terms on the Executive Committee, and a term on the NTEP Board of Governors. He was the NCWM Chairman in 1994 and Chairman of the NTEP Board of Governors in 1995. In 2001, he returned to the Board of Directors where he served as Treasurer through 2006. Most recently, he has served as Credentials Committee Coordinator. He worked very hard to establish a National Train the Trainer Program when he served on the Education, Administration, and Consumer Affairs Committee and worked closely with the Office of Weights and Measures to obtain the funding necessary to accomplish this. His tenure on the Privatization Work Group opened the eyes of legislators to the pitfalls of privatizing Weights and Measures.

This man has been a leader at all levels of weights and measures enforcement, never seeking personal reward but always demonstrating concern for consensus and integrity in his arguments to advance the philosophy of Equity in the Marketplace. His service records to his state and regional associations are equally impressive. In addition to those associations, he is also affiliated with the International Society of Weighing and Measuring, International Society of Antique Scale Collectors, New England Parking Officials, Massachusetts Parking Officials Association, Massachusetts Licensing Officials Association, and if that isn't enough, he has probably attended more Western Weights and Measures Association meetings than anyone who lives in the western region. NCWM proudly recognizes Tom Geiler with the 2012, NCWM Lifetime Achievement Award.

Distinguished Service Award Recipient

Charles Carroll



Pictured: Kurt Floren, NCWM Chairman, congratulates Charles Carroll for his distinguished service.

Charlie is a native of Chelsea, Massachusetts, and currently resides in Wakefield. He is a graduate of Boston College High and attended the University of Massachusetts Boston and Harvard School of Government. In his long history of weights and measures service, he was Deputy Sealer of Weights and Measures in Chelsea from 1959 to 1971. He was Inspector of Standards for the Massachusetts Division of Standards from 1971 to 1973. He was then appointed to Supervisor until 1983 when he was appointed Assistant Director. In 2008, he was again promoted with an appointment to his current position as Director of the Division of Measurement Standards. He is in his 53rd year of service in weights and measures. During this time, he has maintained membership and active participation in the Eastern and Western Massachusetts Weights and Measures Associations, the state Weights and Measures Association, the Northeastern Weights and Measures Association, and the National Conference on Weights and Measures. He rounds out his interests as an avid fan of Boston professional sports, and he enjoys bowling and golf.

Charlie attended his first NCWM Annual Meeting in 1982, and this year marks his 31st consecutive year of attendance. During those years, Charlie has served twice as NCWM Vice-Chairman. He served four years on the Resolutions Committee, chairing that committee two of those years. He served five years on the Specifications and Tolerances Committee, chairing that committee for two years. In 1992, Charlie participated in a Canada/United States meeting to explore opportunities in legal metrology to reduce trade barriers between our countries. From 1996 to 1998, Charlie served on the NCWM Executive Committee and the NTEP Board of Governors. After NCWM incorporation, Charlie served on the Board of Directors and NTEP Committee from 1999 to 2000 and again from 2005 to 2009. He served on the Nominating Committee in 2011 and 2012. Charlie also served on the state committee that developed the certification criteria and text questions for state certification.

What isn't recognized in his list of services is Charlie's consummate quiet gentleman's approach to every situation: filled with the wisdom of his years of experience and his friendly smile. He has calmly served as a leader to NCWM through difficult and exciting times of transition and growth. All of the qualities recognized here have also been recognized by his colleagues at the regional and state levels where he was the recipient of the Northeastern association's 1985 Man of the Year Award and the Massachusetts Weights and Measures Lifetime Achievement Award in 2005.

Distinguished Service Award Recipient

Tina Butcher

Tina Butcher, Group Leader for the Legal Metrology Devices at the National Institute of Standards and Technology (NIST), Office of Weights and Measures (OWM) began her public service in the Pest Management Program at the Maryland Department of Agriculture. The pest management experience must have prepared her well for her illustrious career in weights and measures. In 1983, she was transferred to Maryland's Weights and Measures Program where she spent five years as a field inspector.

In 1987, she moved to NIST, OWM. With that move, Tina quickly became involved in many NCWM activities. Among her list of contributions, she was technical advisor to the Task Force on Energy Allocation in 1988 and 1989; the Multiple Dimensions Measuring Devices Work Group in the early 1990s; the Task Force on Safety from 1989 to 1991; the Executive Committee in 1991; the Liaison Committee in 1993 and 1994; the Handbook 44 Reorganization Work Group from 1999 to 2001; and the Automatic Temperature Compensation Steering Committee in 2008 and 2009. Her technical advisor service to NCWM standing committees include the Specifications and Tolerances Committee from 1993 to 1998 and again from 2008 forward, and the Professional Development Committee in 2007 and 2008. Tina is well-known for her contributions over many years to the National Type Evaluation Program. She has been technical advisor to many NTEP groups including the Measuring Sector from 1988 to 1995 and from 2008 to 2011; the Weighing Sector from 1992 to 1997, the Grain Moisture Meter Sector from 1992 to 1995, the Belt-Conveyor Scale Sector in 1997, the NTEP Committee from 1999 to 2001; the Laws and Regulations Committee regarding the model NTEP regulation from 1999 to 2002; the United States/Canada Mutual Recognition Work Group from 1994 to 2000; and the NTEP Long-Term Business Plan Work Group from 1998 to 2000. Tina was the NTEP Manager from 1994 to 2000 prior to transfer of its administration to NCWM. In addition to all of these contributions to NCWM, Tina has made significant contributions at NIST with developmental assignments in the Malcolm Baldrige National Quality Award Program and in the NIST Director's Office in 2002 and 2003. She was the recipient of the U.S. Department of Commerce Bronze Medal in 2003.

Through all of this continuing service, Tina has made significant and lasting contributions to codes throughout Handbook 44 and was integral in the creation of code sections such as the Mass Flow Meter Code. She is widely regarded for her superior technical writing skills and her calm manner that leads to input from others toward sound decision making. She has also earned the respect of NCWM members for her ability to inject important technical and historic information while avoiding personal dictation in the decisions. Tina's long-term service to NCWM and the weights and measures community is truly remarkable. Tina's personal time is devoted to her family and other activities including the Altar Guild and teaching children's classes at her church. She is Co-Director of her church's Junior Daughters of the King Chapter and enjoys volunteering in her daughter, Holly's, various sports and school activities.



Pictured: Kurt Floren, NCWM Chairman and NIST, Office of Weights and Measures' Tina Butcher.

Distinguished Service Award Recipient

Ronald Hayes

Ron Hayes, Missouri Weights and Measures Director, received his education in computer science and mathematics from Missouri University of Science and Technology. In 1976, Ron went to work for the Missouri Department of Agriculture. In his early years, he was a grain moisture meter inspector and assisted the department in developing that new program. He taught laboratory techniques in his role as a laboratory assistant, and he performed petroleum tests as an assistant metrologist. In 1982, Ron was promoted to Fuel Quality Program Administrator and Laboratory Manager. In 2008, he was again promoted to his current position as Director of the Division of Weights, Measures and Consumer Protection.



Pictured: Kurt Floren, NCWM Chairman, presents award to Ron Hayes.

Ron attended his first NCWM Annual Meeting in 1984, and this is his 23rd year of attendance. Ron's experience managing the Petroleum Laboratory formed the foundation of much of his service to NCWM in his early years. He has been a member of the Southern Weights and Measures Association and the Central Weights and Measures Association after it was formed in 1985. He has been a member of the NCWM Fuels and Lubricants Subcommittee since 1992. He has chaired that subcommittee since 2006. Ron chaired the Motor Fuel Regulation Working Group from 1993 to 1995. He has also served as a member of the Premium Diesel Work Group and the Automotive Lubricants Work Group. Ron served as a Presiding Officer of our Annual Meetings in 2003, 2004, and 2005. In addition to his current responsibilities as chair of the Fuels and Lubricants Subcommittee, Ron is an officer on the NCWM Board of Directors.

Much of Ron's work over these many years has been in concert with standards development within ASTM International as a member of the ASTM D02 Committee on Petroleum Products and serving on many subcommittees under it. NCWM and ASTM have much in common and Ron has greatly assisted both organizations to maximize each other's resources toward common goals. An employee of his once described

Ron as "wicked smart." We can all agree with the spirit of that compliment, and we are grateful that he has applied his talents to our benefit.

Distinguished Service Award Recipient

Chris Guay

Chris Guay is a Regulatory Fellow at Procter and Gamble Company. He resides in Mason, Ohio, and has many hobbies including hiking, backpacking, photography, painting, and electric trains. He graduated Magna Cum Laude with a Chemical Engineering Bachelor of Science degree from the University of Illinois in 1982 and received his MBA in Management from the University of Cincinnati in 1990. Chris has been a regular attendee and supporter of the Ohio, Central, Northeastern, Southern, and Western Weights and Measures Associations as well as many other trade associations affiliated with Procter and Gamble product lines.

Chris attended his first NCWM Annual Meeting in 1990, and this year is his 21st year of attendance. His official service began in 1993 on the Associate Membership Committee. He served that committee from 1993 to 1995, 1997 to 2001, 2004 to 2005, and 2007 to present with his current term to expire in 2015. During those years, he was Vice-Chairman of the Associate Membership Committee in 1993, 2007, 2011, and 2012, and chaired the committee in 1994 and 2008. Chris chaired a special task group under the Associate Membership Committee from 1993 to 1995 that developed recommendations to increase the involvement of industry membership in the NCWM structure, including appointments to standing committees. Sometimes you get what you ask for, and Chris was appointed to the Administrative and Public Affairs Committee from 1996 to 1998. This was followed immediately with a five-year term on the Laws and Regulations Committee from 1999 to 2003. In 1998, Chris participated in an important planning meeting as NCWM was transitioning into a nonprofit corporation that needed administrative support. He served on the Nominating Committee in 2001 and 2002. He served a five-year term on the Board of Directors from 2004 to 2008. Today, in addition to his service to the Associate Membership Committee, Chris is Chairman of the new Packaging and Labeling Subcommittee. This subcommittee was his brainchild to assist the Laws and Regulations Committee and NCWM to effectively address critical issues in the consumer packaging industry.

We have come to cherish Chris' ability to speak softly, intelligently, and directly; never one to sugar coat a situation. In Chris' home state of Ohio, he recognized the value that county officials could bring to the regional and national scene, and he worked directly with them to show them the way at a time when NCWM had a need for the additional expertise and leadership. Chris was mentored in his early years by one of our most cherished industry members, Bill Braun, who pushed us all to be organization oriented, not issue oriented. Chris is just that person as represented by his words, his service, and his actions. For this reason, he was awarded the Bill Braun Award by the Central Weights and Measures Association in 2008.



Pictured: Kurt Floren congratulates Chris Guay, recipient of the Distinguished Service Award.

2012 Contributions Award Recipient

Tim Tyson

The Contributions Award was presented to Tim Tyson, Director of the Kansas Department of Agriculture, Weights and Measures Division.

Tim obtained his Bachelor of Science degree in Animal Science from Kansas State University. He also holds a Bachelor of Science degree in Computer Science from Friends University in Wichita. Prior to his employment with the Kansas Department of Agriculture, Tim spent 14 years at the management level in food manufacturing facilities and three years in software development in the insurance industry. In 2006, Tim was named Director of Weights and Measures for the State of Kansas. He is also Director of the Department's Feed and Seed Division and Grain Warehouse Licensing. In addition to their day jobs, Tim and his wife, Karyn, operate a ranch, and he enjoys hunting.

In a very short time, Tim was recognized for his leadership abilities in the weights and measures community. He was Chairman of the Central Weights and Measures Association in 2008. He joined the NCWM Board of Directors in 2008 as an at-large director. He was elected as Chairman-Elect for 2010 and NCWM Chairman of the Board in 2011. This year, Tim chaired the Nominating Committee, and he is completing his service to the Board of Directors this week as the NTEP Committee Chair.

Tim is thought of as the “quiet man from Kansas.” He is a man of few words, but when he speaks it is direct, on point, and spoken with authority and confidence. He is highly regarded for his ability to listen, analyze, and provide leadership with wisdom. His regional association, the Central Weights and Measures Association (CWMA) has noted his significant efforts and leadership in the areas of commodity labeling and moisture allowance standards. In the past year, he has been innovative in his approach to demonstrate the impact and importance of weights and measures regulatory oversight for the citizens in Kansas.



Pictured: Tim Tyson receives the 2012 Contributions Award from Kurt Floren.

Attendance Recognition

5th Year Attendees

John Albert	Missouri Department of Agriculture
Chris Bradley	Seraphin Test Measure
James Brown	Petroleum Equipment Institute
James Byers	San Diego County, California Weights and Measures
Chuck Corr	Archer Daniels Midland Company
John Eichberger	National Association of Convenience Stores
Ivan Hankins	Iowa Department of Agriculture
Krister Hard af Segerstad	IKEA
Fran Elson-Houston	Ohio Department of Agriculture
Zina Juroch	Pier 1 Imports
Dmitri Karimov	Liquid Controls
James McGetrick	BP Products
Kristin Moore	Renewable Fuels Association
Julie Quinn	Minnesota Department of Commerce

Rob Underwood	Petroleum Marketers Association of America
Craig VAnBuren	Michigan Department of Agriculture and Rural Development
Tim White	Michigan Department of Agriculture and Rural Development

10th Year Attendees

Cary Ainsworth	USDA, GIPSA
Jerry Buendel	Washington State Department of Agriculture
Judy Cardin	Wisconsin Department of Agriculture, Trade and Consumer Protection
Rafael Jimenez	Association of American Railroad Transportation Technology Center
Thomas McGee	PMP Corporation

15th Year Attendees

Charles Ehrlich	NIST Office of Weights and Measures
Kurt Floren	Los Angeles County California Weights and Measures
Alan Johnston	Measurement Canada
Robert Murnane	Seraphin Test Measure
Bill Ripka	Thermo Fisher Scientific

20th Year Attendees

Norman Brucker	Precision Measurement Standards, Inc.
Michael Keilty	Endress + Hauser Flowtec AG USA
Don Onwiler	NCWM

25th Year Attendees

Louis Straub	Fairbanks Scales
Richard Suiter	Richard Suiter Consulting

35th Year Attendees

Thomas Geiler	Town of Barnstable, Massachusetts Weights and Measures
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