PRESENT A PAPER AT THE
2010 NCSLI CONFERENCE

The 2010 conference theme is “21st Century Innovations in Metrology.” You can take advantage of this opportunity to share your related metrological experiences, the results of your hard work on a committee, or some specialized measurement techniques you have developed. This opportunity gives you a chance to speak to, and become known by, your peers all over the world.

Papers at all levels of metrology and calibration are accepted for peer review. Moreover, your paper, if selected, will become part of the Conference Proceedings, which is distributed on CD internationally to members, so that your effort is broadly shared with all NCSLI members and serves as an educational benefit for years to come.

If you want to step into the spotlight to share and educate please send all abstracts of 350 words or less to callforpapers@ncsli.org no later than January 18, 2010. Include complete contact information and a short bio of the author. See NCSLI’s website for abstract and paper format. All authors will receive a reduced conference registration of $350 if your abstract is submitted by January 18th and complete paper is received by May 10, 2010.

21ST CENTURY INNOVATIONS IN METROLOGY
Rhode Island Convention Center, Providence, RI
July 25 - July 29, 2010

callforpapers@ncsli.org | Exhibit Sales: exhibits@ncsli.org | Sponsorship Programs: cgullka@ncsli.org
CONTENTS

2 | From the President
3 | The Boardroom
4 | NCSLI New Members
5 | NCSLI Calendar
20 | Learning + Development
26 | Metrology In Pop Culture
28 | Committee News
30 | Regional News
38 | International News
47 | Sudoku
48 | Advertisers Index

FEATURES

6 | 2010 NCSLI Workshop & Symposium
   Providence, Rhode Island July 2010
8 | People Making a Difference
   Professor Andrew Wallard
12 | Corporate Outreach
   3M Brings TECH, TWIST
   and Visiting Wizards
16 | Back in the Day
   Fused Quartz Bourdon Tube
   Pressure Sensors
NCSLI has always offered wonderful support to my organization. In my case, Boeing has internal calibration labs supporting its aerospace industry.

I attended my first NCSLI Annual Workshop & Symposium in Washington, DC in 1990. My individual participation was as a replacement for my supervisor who couldn’t attend that summer. During the Conference I joined the technical network supporting calibration interval analysis; specifically the RP-1 Committee. My engineering metrology lab had a huge inventory of test and measurement equipment and we needed to take advantage of the expertise offered on intervals. By working with our primary standards lab, NCSLI tools (software and practices), we were able to implement a statistically based interval system. Later this effort on managing calibration intervals expanded to other labs including production quality metrology labs. It is now, 20 years later, deployed throughout the enterprise. We use NCSLI as the metrological foundation for practices that bring measurement traceability to our product.

My first region meeting was at Idaho National Laboratory, Idaho Falls, Idaho, in autumn of 1990. The expanse of the Northwest region has provided excellent meetings and a chance to review metrology in wide applications from a submarine base and a B1 bomber base to the aerospace labs and major instrument maker’s facilities in Richland, Washington. Local calibration laboratories have also facilitated meetings from Portland to Vancouver, British Columbia.

In 1961 the cooperation between NIST and industry created NCSLI, a framework for best practices. In 1992 the vision expanded to authoring national standards. In 1992 funding was in jeopardy for our primary standard’s management to attend the Z540 effort for a national calibration standard. To ensure our industry’s participation I joined the TQM (Total Quality Management) Committee. Funding on the commercial side of the company was available whereas the funding on the government contract side was not. Eventually this ANSI/NCSLI Writing Committee and the resulting standard Z540.1 created a foundation for the accreditation of US calibration labs. NCSLI participation and influence helped create ISO 17025 from Guide 25. This activity and the influence of NIST have brought BIPM participation to the NCSLI Board of Directors.

It is not surprising that the resources of NCSLI are used so extensively, but still some are surprised by their impact. Several meetings after I joined the Calibration Intervals Committee I mentioned that we were successfully using one of the statistical methods of the recommended practice. Even long standing members turned their heads. Yes, NCSLI’s work is very useful! The RP-1 is authoritative and complete but apparently many users don’t take it very far. The committee has continued to work on supporting interval subjects, but even the published practice is more than adequate, in fact it is also unique in that it explains and advises against some existing, errant techniques.

Our use of NCSLI is so entrenched in all our metrology practices one of our engineers suggested we should spend the travel money on something different! So after 50 years we’ve solved all the problems. Good to know.

During the next year, the focus of the President, the Board of Directors and the extended leadership of NCSLI International will continue to concentrate on Learning and Development, Marketing, Membership, and International growth.

I look forward to this year with NCSLI International and hope we can put such a finely tuned machine to work in metrology in the year ahead. Through NCSLI our industry and our national standards lab have created a brilliant facility for working together.
The fall 2009 NCSLI Board meeting was held in Albuquerque, New Mexico October 12–14, 2009. President Malcolm Smith welcomed 24 attendees, including Board members, committee representatives, and visitors.

by Dave Abell
NCSLI Secretary

NIST Representative, Dr. Belinda Collins reported the appointment of physicist Patrick Gallagher as the 14th Director of the National Institute of Standards and Technology (NIST). Gallagher, 46, is currently the NIST Deputy Director.

Particularly poignant in Belinda’s NIST report was that after seven years on the NIST campus, more than 200 pieces of structural steel from World Trade Center Towers 1 and 2 were returned to the Port Authority of New York. The steel was collected by NIST researchers as part of their multi-year comprehensive investigation into the probable cause of the building collapses following the attacks on the World Trade Center on September 11, 2001. A convoy of 25 tractor trailers traveled with a police escort along major highways, attracting attention from motorists and television traffic helicopters.

Executive Vice President Derek Porter reported he accepted an invitation from Prof. Andrew Wallard of the Bureau International des Poids et Mesures (BIPM) to attend the CIPM-MRA decade event in Paris on behalf of NCSLI and Boeing. Derek also arranged to have Randy J. Tinseth, Vice-President of Marketing for Boeing Commercial Airplanes speak at the event on the importance of metrology to the airline industry.

Georgia Harris, VP of Learning and Development led a special session for the board where she reviewed the activities of her committees. Learning and Development has been a focus of Malcolm Smith’s objectives and will continue to be during Derek Porter’s term in 2010.

President Malcolm Smith reported on his recent trip to the IMEKO Conference in September 2009 in Lisbon, Portugal. There were 694 papers presented from 41 countries. The conference had 560 registrations and they estimate about €30,000 net from the conference. He has invited IMEKO representatives to our next year’s Conference.

Lonnie Spires, VP of Operations reported that the latest issue of *metrologist* Magazine marks the two year anniversary of this successful publication. NCSLI Business Manager reported that the conversion to the new IMIS information system in the NCSLI Boulder office is going well, and committee members will be able to soon maintain their own websites.

Incoming President Derek Porter plans to continue the concentration on membership growth, learning and development programs, and international activities. He will use the recently installed new web system at NCSLI headquarters to make the old “Directory of Standards Laboratories” more interactive as a “Calibration and Metrology Directory” with members updating the entries directly.

Jack Somppi and Jesse Morse (attending by telephone) collected a list of “big ideas” for the marketing team. They also reemphasized the role of NCSLI as an Educator.

The meeting concluded with a motion to sign a Memorandum of Understanding with the Measurement Science Conference (MSC) Board to promote mutual cooperation between the two organizations.

The Board always welcomes visitors at these meetings and the next one is scheduled January 24–27, 2010 in Monterey, California.

dave.abell@pacbell.net
Technology Solutions
Technology Solutions provides precision test and measurement equipment, calibration, training, consultancy and measurement solutions from local and international manufacturers to the Southern African measurement market. Committed to service excellence, Technology Solutions aims to maintain customer test and measurement equipment at consistently high levels of operation and accuracy with the SANAS accredited service and calibration laboratory. Technology Solutions maintains a Quality Management System in terms of ISO 17025:2005. Present accredited parameters include photometry and anemometry.

Luke W. Hards
PO Box Pierre Van Ryneveld
45 South Africa
Phone: +27-1-2345-5358
Email: luke@technologysolutions.co.za

Control House Inc.
Dave Mueller
1450 Park Court, Suite 1
Chanhassen, MN 55317 USA
Phone: 952-474-1200
Email: dmuellel@controlhouse.com

Dytran Instruments Inc.
Lynn Campbell
21592 Marilla St.
Chatsworth, CA 91311 USA
Phone: 818-700-7818 x138
Email: lcampbell@dytran.com

Agilent Technologies
Electronic Measurement Group
As the world’s premier measurement company, Agilent works in close collaboration with engineers, scientists, and researchers around the globe to meet the communications, electronics, life sciences, and chemical analysis challenges of today and tomorrow. The company operates two primary businesses: electronic and bio-analytical measurement supported by Agilent Laboratories, its central research group.

Charles R. Fallon
Electronic Measurement Group
10090 Foothills Blvd
Roseville, California 95747 USA
Phone: 916-788-5594
Email: charles_fallon@agilent.com

Agilent Technology China
Communication Operation
Agilent Technology Software Co., Ltd. A worldwide customer support and service division providing metrology/calibration services to customers.

Sulan Zhang
Senior Metrologist
Worldwide Customer Support and Service
No. 3, Wangjingbelu, Chaoyang District
Beijing, 100102 China
Phone: 8610 64396780
Email: su-lan_zhang@agilent.com

RTI International
RTI is an independent organization dedicated to conducting innovative, multidisciplinary research that improves the human condition. With a worldwide staff of more than 2,800 people, RTI offers innovative research and development and a full spectrum of multidisciplinary services. Universities in North Carolina founded RTI in 1958 as the first scientific organization in and centerpiece of the Research Triangle Park.

Keith Pardee Kemsley
PO Box 12194
Research Triangle Park, NC 27591 USA
Phone: 919-541-7389
Email: kkemsley@rti.org

National Metrology Laboratory, SIRIM Berhad
NML-SIRIM is the National Measurement Institute of Malaysia and is a member of the BIPM and the CIPM-MRA. The scope of work includes physical and chemical measurements and legal metrology.

Abdul Rashid Bin Zainal Abidin
National Metrology Laboratory
Lot PT 4803
Bandar Baru Salak Tinggi, Sepang,
43900 Malaysia
Phone: +60-3-8778-1771
Fax: +60-3-8778-1661
Email: abd.rashid_z.abidin@sirim.my

NCSLI New Members

STAYING COMPETITIVE

Staying current with ever-changing technology can be very difficult in today’s fast-paced world.

And staying current with measurement science in your industry can be even more difficult.

CONTACT NCSL INTERNATIONAL AT 303.440.3339 OR VISIT US ONLINE AT WWW.NCSLI.ORG FOR MEMBERSHIP INFORMATION
NCSLI Calendar

Region / Section Meetings

January 14, 2010
Maryland Section 1211
The American Association for Laboratory Accreditation (A2LA)
5311 Buckeystown Pike, Suite 350
Frederick, MD United States
Contact: Robert Knake
Phone: 301-644-3218
Fax: 301 662 29741311
Email: rknake@a2la.org

February 4, 2010
Twin Cities 1311
New Brighton Community Center
400 10th Street NW
New Brighton, Minnesota United States
Contact: Kevin Rust
Phone: 952-937-4790
Email: kevin.rust@mts.com

February 17, 2010
Central CA/Nevada 1410
Agilent – Roseville
Roseville, California United States
Contact: Richard Fertell
Phone: 650-964-4163
Email: Richard@proteusind.com

Board of Directors Meetings

January 24-27, 2010
Monterey California
Hyatt Regency Monterey
Hotel: 831-372-1234

April 25-28, 2010
Boulder, Colorado
Homewood Suites
Hotel: 303-499-9922

July 25, 30-31, 2010
Providence Rhode Island
Westin Providence RI
Hotel: 800-627-7154

October 17-20, 2010
Stevenson Washington
Skamania Lodge
Hotel: 800-221-7117

July 25-29, 2010
21st Century Innovations in Metrology
Rhode Island Convention Center
Providence, Rhode Island
ncsli.org
303-440-3339

NCSLI Workshop & Symposium

International Events

April 19-23, 2010
CAFMET 20
International Metrology Conference
Contact: CAFMET Secretariat
Email: cafmet2010@ac-metrology.com
www.ac-metrology.com

May 31-June 4, 2010
TEMPMEKO & ISHM 2010
Portoroz, Slovenia
Tel: +386 1 4768 224
Fax: +386 1 4264 633
Email: info@tempmeko-ishm.org
www.tempmeko-ishm.org

June 13-18, 2010
CPEM 2010
Conference on Precision Electromagnetic Instruments
Contact: CPEM Secretariat
Tel: +82-42-472-7464
Email: secretariat@cpe10.org

October 13-15, 2010
FLOMEKO 2010
Taipei, Taiwan
Contact: Dr. Jiunn-Haur Shaw
Jiunn-HaurShaw@itri.org.tw
Ms. Hui-Chung Ma
Email: hmca@itri.org.tw
www.flomeko2010.itri.org.tw

For detailed information on all NCSLI Meetings go to www.ncsli.org or call 303-440-3339
Rhode Island Convention Center Complex

The Rhode Island Convention Center (RICC) is located in the heart of downtown Providence. The Complex is comprised of two multi-purpose facilities; the Rhode Island Convention Center and the Dunkin’ Donuts Center, also known as The Dunk. For added convenience, the Convention Center is attached, via a skywalk, to the Westin Hotel and Providence Place Mall. Providence’s T.F. Green Airport is only 15 minutes away!

Rhode Island Convention Center
Providence, Rhode Island

July 25 – July 29, 2010

REGISTRATION RATES

<table>
<thead>
<tr>
<th></th>
<th>Advance Rate Ends March 31, 2010</th>
<th>Regular Rate Begins April 1, 2010</th>
<th>Late Rate Begins June 30, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member Rate</td>
<td>$875</td>
<td>$925</td>
<td>$1,025</td>
</tr>
<tr>
<td>Non-Member Rate</td>
<td>$1,075</td>
<td>$1,125</td>
<td>$1,225</td>
</tr>
</tbody>
</table>

TUTORIAL RATES

<table>
<thead>
<tr>
<th></th>
<th>Regular Rate Ends June 29, 2010</th>
<th>Late Rate Begins June 30, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half Day Session</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member Rate</td>
<td>$175</td>
<td>$200</td>
</tr>
<tr>
<td>Non-Member Rate</td>
<td>$225</td>
<td>$250</td>
</tr>
<tr>
<td>Full Day Session</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Member Rate</td>
<td>$300</td>
<td>$325</td>
</tr>
<tr>
<td>Non-Member Rate</td>
<td>$350</td>
<td>$375</td>
</tr>
</tbody>
</table>

Workshop & Symposium Registration INCLUDES: Exhibitors Reception, Entrance into the Paper Sessions; Entrance into the Exhibit Hall; Lunches (Monday–Thursday); One Banquet Ticket; Workshop materials, including the Proceedings (CD-ROM only)

Workshop & Symposium Registration DOES NOT INCLUDE: The International Event; NCSLI Tutorials (see Tutorial Registration Form for fees); Guest Program Tours (see Guest Registration Form for fees); Hotel Registration, Airfare, Rental Car.

Exhibitors and Speakers Registrations include Workshop & Symposium privileges as noted above.

Exhibit Only registrations (booth workers) DO NOT include any Workshop & Symposium privileges except entrance to the Exhibit Hall and Exhibitor’s Reception. Tickets for lunches and Banquet may be purchased separately, if desired (Banquet: $85 per person; lunches: $35 each per person).

Guests

All Attendees and Guests who are attending any NCSLI International function must be registered, even if they are only participating in the Sunday evening reception. Badges are required.
NCSLI Headquarters Hotel
The Westin Providence
One West Exchange Street
Providence, Rhode Island 02903
Reservations:
(401) 598-8000
Fax: (401) 598-8200
Room Rate: $174

The Westin Hotel is conveniently located in
downtown Providence and is connected to the
Rhode Island Convention Center and the new
Providence Place Mall. Gourmet restaurants and
historic attractions are all within walking distance.
Relax in your own Heavenly Beds®, which
come standard in each of the 564 guest rooms
and suites. Guests enjoy spacious accommoda-
tions with beautiful city views and oversized bath-
rooms. The Westin has everything you need to
relax and renew.

Hilton Providence
21 Atwells Avenue
Providence, Rhode Island 02903
Reservations:
(401) 831-3900
Fax: (401) 751-0007
Room Rate: $159

The Hilton Providence hotel is a full-service luxury
hotel with 274 beautifully appointed guestrooms.
Located in the heart of downtown within walking
distance to Historic Federal Hill, Providence Place
Mall, Rhode Island Convention Center and adja-
cent to the Dunkin Donuts Center. Shula’s 347, an
onsite restaurant presents all-day dining with ex-
ceptional cuisine. There is a seasonal patio where
patrons are invited to dine al fresco and watch the
city go by. The Starbucks® café is the perfect spot
so discover a wide variety of coffees.

Courtyard Providence
Downtown 32
Exchange Terrace at Memorial Blvd
Providence, Rhode Island 02903
Reservations:
(401) 272-1191
Fax: (401) 272-1416
Room Rate: $159

Courtyard by Marriott Providence Hotel is in the
heart of downtown. Choose to stay in the center
of it all, directly across from the Rhode Island
Convention Center.

GUEST PROGRAM
Historic & Scenic Newport
Monday, July 26, 2010
An overview of Newport, rich in history and spec-
tacular “summer cottages”, is provided through
a narrated driving tour. The Breakers, a 70-room
estate, was built in 1895 and modeled after a
northern Italian Renaissance palace. There will
be free time for shopping at scenic Brick Market-
place and Bannister’s Wharf, which is home to a
number of small eateries for lunch on your own.
Price: $100

Mystic Seaport Tour
Tuesday, July 27, 2010
By the middle of the 19th century the fastest clip-
per ships in the United States were being built in
Mystic, Connecticut. Learn about this period at the
Mystic Seaport Museum, which covers 17 acres
and features historic homes, shops and trade
buildings representative of life in a seaport. A shut-
tle will be provided from the Seaport to downtown
Mystic where there are many shops and restau-
rants. Lunch at the Seaport or downtown.
Price: $100

Providence City Tour
Wednesday, July 28, 2010
Once known as the “Renaissance City”, explore
Rhode Island’s creative capital. See historic build-
ings, parks and visit the Johnson & Wales Culina-
ry Archives. Stop for lunch at Historic Federal
Hill and continue your culinary experience with a
tour of the historic neighborhood featuring private
kitchens and bakeries.
Price: $70
My father was passionate about science and had not the Second World War intervened he would have trained for the medical profession. However, he and my mother became teachers and had no hesitation in ensuring that I was able to take advantage of a “good education,” one in which maths and science as well as literature and history featured prominently. My father loved the neat elegance of maths, and so on car journeys from our home in Liverpool to my grandparents’ cottage in North Wales he was always running mini-mental arithmetic challenges. Learning one’s “tables” as well as being able to give quick responses to questions was a challenge for me as well as for my younger brother. During holidays he always had ideas for simple experiments and I suppose we learned rapidly from that practical experience without realizing it. He also bought me a book (sadly now out of print, and I don’t have the original) called “Man must Measure.” I remember it all very well and it appealed to me - it combined science and history. I was at the time (aged about eleven) determined to be an archaeologist and then, perhaps, Director of the Victoria and Albert Museum in London! Well, the measurement part stuck anyway!

With one grandfather an engineer and the other a carpenter I should have known that the practical science route was for me - particularly if it combined some of the communication skills of my parents.

At high school (an experience shared with two of the Beatles) I certainly leaned in that direction and until the age of about 15 thought that my future lay in chemistry. That changed into the desire to study “real” physics when I realized that the chemistry I most enjoyed was atomic structure.

I then fell under the influence of an inspirational physics teacher, Ray Davis, a dynamic young man who encouraged me to go on after school to his own Alma Mater, the University of St Andrews in Scotland. Years later when that “young teacher” was nearing retirement and I was the Deputy Director of the National Physical Laboratory I was delighted to spot him at the Royal Institution (RI) in London as he listened to his one-time student’s invited lecture on Metrology, entitled “There or Thereabouts”!
The RI is a hallowed institution where Michael Faraday was Secretary for many years. He started the “Friday Discourses” aimed at the common man and they became so popular that the street in which the RI was located became London’s first “one-way” street because of the blockage caused by the non-so-common man arriving by horse drawn carriage. The other peculiarities about the “Discourse” is it’s meant to last one hour exactly (a real metrological challenge) and that it was to be full of experiments. I loved it and had as many realizations of the SI as I could in the hall. Before the lecture I was taken to Faraday’s study with a copy of his “Notes for Lecturers,” a bit late I thought – where, following tradition, I was locked in, as has happened since Sir Charles Wheatstone, who was due to give a similar Discourse in earlier days, but ran away with fright!

Back to my earlier days and my introduction to laser physics which later led me to the NPL and the beginning of a research career. A young lecturer, Arthur Maitland, had just joined the Physics Department at St. Andrews and we became friends. He had the intensely practical approach of someone with an industrial background and was my second inspirational teacher. We decided to build what was, I think, one of the first gas lasers in the UK, and this led to a six week summer placement at the NPL on lasers and holography.

After graduating the NPL was my natural choice – a sort of half way house between industry and academia. My experiment on designing a laser system that would replace the then SI length standard (light from a krypton discharge lamp) and on measuring the speed of light was more of the latter than the former. Accustomed to experiments lasting perhaps a few days, I thought that a new length standard may take a few weeks – but ten years later on we had a proven system! We also had the chance to collaborate with others who wanted to use the new techniques. However, it taught me another lesson about metrology – an improved measurement technique may not have immediate application, but quickly the ability to measure more precisely spawns many innovations and new ideas.

Then my career took a new turn. The NPL’s Deputy Director called me to see him and “suggested” (one never turned down one of his “suggestions”) that I leave the lab and go to work for Dr. Duncan Davies, the Chief Scientist of the Government Department responsible for science and industry. Duncan himself was an industrialist but an incredible polymath. His encyclopedic knowledge of art, music, and literature were combined with a deep appreciation of the contribution that science and engineering could make to an economy.

He was the third inspiration in my life and, I suppose, took me under his wing keeping an eye on me when I went back to a small marketing unit established at the NPL in the early 80s, and then luring me back once again to headquarters work. He created a small group and called us “technological generalists.” He wanted us, essentially, to know “a bit about a lot” and to have the ability to ask a key question to draw out the essential facts.

I went on to work, always in the scientific area and often with an international dimension, for a number of Ministers – the politicians at the top of the Departments. Here I learned of the need to balance rigor and immediacy. It was a hard lesson, as we scientists always tend to try to squeeze more into a short policy paper or give more detail than is necessary for political decisions. However, maybe because of my childhood, I enjoyed writing and communicating and learned to live with the compromise.

Duncan always said I was destined for life as a laboratory director and the next step along that road came when I was offered the job of Deputy Director of the NPL in 1990. This was another sort of experiment, as NPL at that time was given more management freedoms in an “Agency” than were possible within a traditional government structure. I had responsibility for the science programs and, together with the Director, we soon realized that the political wish was that the “Agency,” if a success, would lead to a different style of management of the lab.

In a few years NPL’s overall management was under a contract to a private sector company SERCO. This happened in 1995, and I elected to stay at NPL as the senior “old-style staff member” and help to steer the ship in its new environment. We learned a lot, again balancing a rather exciting and sharper, quicker, decision-making company culture with that of a national scientific establishment. I think we pulled it off, due in no small part, to the wisdom of Dr. George Gray, the SERCO Chairman, himself an engineer, who realized that a precious national asset like the NPL needed his personal care and attention.

At the turn of the century I thought that retirement at 60 was probably beckoning but the Directorship of the BIPM was about to become vacant. I knew the organization because I had become a member of its
management committee, the International Committee for Weights and Measures or CIPM when SERCO became responsible for the NPL. Initially it didn’t seem a real option – we knew my elderly mother and my wife Barbara’s aunt would need our care and attention. However, they both urged me to respond to a number of phone calls from colleagues encouraging me to apply – and the rest is history.

I came to BIPM in 2002 overlapping with the current Director and taking over in January of 2004. I had always been “number two” until then and I realized, quite quickly, that having the buck stop with you is tough. I thought that being responsive to one Government at the NPL was enough of a challenge, but to be held responsible to more than 50 is a circle which is hard to square. Smaller members of the BIPM want a certain set of services – larger ones need us for different reasons. I suppose the lesson of compromise again was applied and we have managed to grow, despite hard financial circumstances, the need to adapt to a changing culture and the necessity for tackling the measurement requirements in new areas of application.

As an erstwhile “technological generalist” I love the challenge of opening up the new areas in which I am far from expert – but which are, I am convinced, essential developments. BIPM is unique – a long tradition, a diplomatic treaty at its roots, a staff of more than 15 nationalities, a mixture of international coordination, research, and a mission of world-wide uniformity of measurement rolled into one. It’s been a privilege to be the Director, and at times it is lonely to be in the place where the buck stops, but I have tried for a consensus approach of consultation, balance and a respect for others’ views and opinions. Managing change is far from easy – preserving the best from the past, as with the NPL, but nudging an organization towards new ways of operating. Attempting to give its entire staff my backing and encouragement to innovate in management, as well as scientific, initiatives can be tricky. Time will tell whether I have it right, but my feeling is that we are “there or thereabouts!”

I was thrilled to be awarded the NCSLI’s Wildhack medal this year. Recognition by peers is always a delight, but NCSLI has had a real place in my heart over recent years. It’s unique – a mixture I have always valued of industry and high metrology – great people, from different cultures and experiences, united in the common goal of advancing metrology. Balancing NCSLI’s North American heritage with the increasing internationalization of its work is, as with all balancing and culture changing acts, a difficult job and I’ve been happy to have played my part.

Other pieces in this series have painted a picture of what its chosen contributors do in their non-professional life. I’ve always felt the need to try to give something back to the society which formed me for so many years. I was – and still am – involved in my local church in the UK, and also enjoyed being Chairman of a group offering sheltered housing to the elderly. It taught me to see the people I met as the strong, intelligent movers and shakers they had been, not just to see them as the frail elderly they had become, and to talk to them as friends and equals.

As the first from a family to go to university, education has always been a passion: small children at the local primary school where I was a Governor, ambitious science students of high schools and colleges where I could indulge myself by giving talks as well as running mock interviews to give them confidence for university, and the students and staff of the University of Wales, Aberystwyth, where I am a visiting Honorary Professor – all are equally important.

As retirement genuinely comes at the end of 2010 I can look forward to gardens and gardening in the South of France. My winter reading will be seed catalogs with the promise of wonderful fruits and vegetables for the cooking which Barbara and I enjoy so much. I shall cultivate my wine cellar and derive as much pleasure from choosing the wines to go with a meal as I do from tasting them. Sadly I no longer play the piano as I did when young, but can, I hope, find more time for a large and eclectic collection of CDs: Pop (including, of course records from my Beatles and Cavern Club days); Jazz; Classical; and English church music, for which I have a particular fondness.

Did I make a difference to metrology and the organizations with which I’ve been involved? I hope so, and hope it was a good one. However, I equally know that they have made a difference to me. I’ve had a chance to build up a career in which all the previous elements have been able to play a part and I’ve been able, I suppose, to add them, bit by bit, so as to finish up where I am.

I’ll still be a keen observer of how everything turns out and shall cherish the good fortune which took me down the metrology path.

awallard@bipm.org
Professor Andrew Wallard, Director of the Bureau International des Poids et Mesures (BIPM), received the 2009 William Wildhack Award from NCSLI International. This award is presented annually in recognition of outstanding contributions to the field of metrology and measurement science. The Wildhack Award is the highest award of our organization and is presented annually at the NCSLI Workshop & Symposium. The award was established in 1970 in honor and recognition of William Wildhack, a long-time employee of the US National Bureau of Standards, now known as NIST. Although Prof. Wallard was announced as the winner in San Antonio, TX, on July 27, 2009. Prof. Wallard, however, was not able to attend the workshop so the presentation of the award was made on November 6, 2009, by Carol Hockert, NIST, at the BIPM in Sèvres, France.

Professor Wallard has spent his lifetime as a dedicated student, scientist and teacher in the metrological world. He was awarded a first class honors degree in physics from St. Andrews University, Scotland, in 1968, and a Ph.D. in 1972. He then worked as a laser physicist at the UK’s National Physical Laboratory (NPL) until 1978. After that, he spent 12 years in various central government positions, including the Prime Minister’s Cabinet Office, and the Department of Trade and Industry where he was a special advisor to various ministers.

Andrew has published some forty refereed scientific papers, generally on laser physics and metrology, numerous conference proceedings, and has contributed to various books on metrology. These accomplishments alone have earned Andrew awards for outstanding contributions to the field of metrology.

Andrew became an active participant on the NCSLI International Board of Directors in 2003, and has played a significant role in its success as an international organization.

Andrew is a true diplomat – and has used this skill for the betterment of NCSLI and the metrology world as a whole.

Congratulations Andrew!
3M Corporate Metrology Services has volunteered our time and talents in several 3M sponsored science outreach programs as a tool to enrich, excite and promote metrology as a career option. By promoting the principles of these programs, we can retain our global competitiveness for future generations of scientists, engineers, and metrology practitioners.

- **3M TECH** (Technical Teams Encouraging Career Horizons) matches pairs of 3M scientists and engineers for classroom visits to middle and high schools to share stories from their own career paths and to encourage students to “keep the door open” for science careers.

- **The 3M TWIST** (Teachers Working In Science and Technology) program allows middle and high school math, science and technology teachers to spend several weeks during the summer working closely with a 3M host laboratory on an actual research project to provide active and challenging technical experiences for teachers.

- The 3M **Visiting Wizards** program encourages grade school children to become more interested in science and technology by promoting interesting educational demonstrations and hands-on experiments in a variety of science topics.

Each of these programs have a separate but integrated outcome, target audience, volunteer list, and are described in Table 1 – Program Description.

By participating in these three programs, 3M Corporate Metrology Services can reach the various layers in educational outreach – from the grade school students, to the middle and high school students, and the teachers of math and sciences.
Volunteering is the practice of people working on behalf of others without being motivated by financial or material gains. 3M has had a long history and is considered a leader in workplace volunteerism, with many thousands of employees and retirees volunteering their time and talents to many of the 3M affiliated programs. Passionate 3M scientists and engineers have shared their skills and career inspirations through the Science Encouragement programs. These science encouragement programs help to stimulate interest and knowledge of science and scientific discovery with students and teachers.

3M encourages employees and supports volunteer service by employees though the Volunteer Pledge to Employees and Retirees:
- To encourage volunteerism to enhance the quality of life in our communities.
- To support their efforts by sharing information about community needs and volunteer opportunities.
- To recognize the sharing of their time and talents to make a difference in our communities.

Another key enabler of the educational outreach programs is the 3M Technical Forum, or “Tech Forum” for short. The Tech Forum is a total volunteer organization of

### Key Enablers of an Educational Outreach Program

3M and 3M Corporate Metrology Services have had a rich and long history on involvement in educational outreach programs. This successful participation has been based upon several key success factors that enable any organization to develop, sustain and improve an educational outreach program. Enablers are a broad set of processes, practices or methods that facilitate the implementation of a best practice, such as educational outreach. Enablers help to explain the reasons why a best practice is successful. Identification of these key enablers comes from a thorough knowledge and understanding of the processes, practices and activities that support the best practice.

The key enablers that help to drive the education outreach programs at 3M include a culture of volunteerism, a strong technical community, dedicated and supported resources to complete the programs expectations, and a well-defined feedback, recognition and continual improvement process.

<table>
<thead>
<tr>
<th>Program</th>
<th>Program Description</th>
<th>Intended Audience</th>
<th>Expected Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECH</td>
<td>Scientists and engineers in teams of two encourage students to explore technical careers through classroom presentations</td>
<td>Typically 7th – 12th Grade Students</td>
<td>Provide an opportunity for students to meet and interact with role models who enjoy their technical careers</td>
</tr>
<tr>
<td>TWIST</td>
<td>Local math and science teachers work closely with a 3M host on an actual research project, and attend seminars and laboratory tours</td>
<td>K – 12th Grade Teachers</td>
<td>Provide an active and challenging technical experience for teachers in an industrial setting</td>
</tr>
<tr>
<td>Visiting Wizards</td>
<td>Trained “wizards” encourage young people to become interested in science and technology by conducting interesting demonstrations and hands-on experiments</td>
<td>Typically K – 6th Grade Students</td>
<td>Help younger students learn the joy of science and engineering through interesting and fun classroom experiments</td>
</tr>
</tbody>
</table>

Table 1. Program Description.
technical professional employees that provides a mechanism to help 3M employees communicate across corporate boundaries, and to become aware of, and help use, all of the resources to grow technically and professionally. Tech Forum “chapters” are organized throughout the technical community in several U.S. locations, manufacturing locations, and many global locations.

Although volunteerism is an important and essential element of a successful educational outreach program, the volunteers must be supported by full or part-time resources dedicated to administer the programs and the financial resources to fund the programs.

The Tech Forum and its activities, and the educational outreach programs are staffed by the Tech Forum Office, a department of the Research and Development Program Administration Organization. Reporting to the Vice President of Research and Development, this department manages the numerous programs and events that foster technology sharing, technical interaction, information exchange, networking and communications in the technical and engineering communities. Several full-time employees with many years of experience working in the technical and engineering areas organize, coordinate, schedule and communicate the educational outreach programs with the volunteers and the surrounding communities. Additionally, these employees may train the trainers in the policies, procedures and delivery of the specific outreach programs, and maintain the supporting websites and documentation.

The activities of feedback, recognition and continual improvement are critical to sustain any successful educational outreach program. Feedback for continual improvement of the outreach programs may come from surveys of the volunteers and the students and teachers participating in the programs. Upon completion of the TECH school visit, the TECH team requests that the school contact completes a pre-addressed survey and provides opinions, ratings and suggestions for improvement to the TECH program. In addition to the demographic information, the program evaluation questionnaire requests feedback on:

- The level of interaction with the TECH team in preparation for the school visit.
- The effectiveness of the presentations, personal background, videos and demonstrations.
- The most favorable aspect of the TECH program.
- Suggestions for improvements in the TECH program.
- The impact and the effect that the TECH program has had on the students and the student’s career choices.

The TECH, TWIST and Visiting Wizards are Science Encouragement programs designed by 3M employees to encourage community involvement and to encourage 3M personnel to be ambassadors to the community. Active participation in these three programs has enabled 3M Metrology Services personnel, to reach the various layers in educational outreach – the grade school students, the middle and high school grade students, and the teachers of math and sciences. To be successful, the education outreach programs must be supported by the key enablers of volunteerism, a strong technical community, dedicated and supported resources to complete the programs expectations, and a well-defined feedback, recognition and continual improvement process.

How are you reaching the
Next Generation…?
Please share your Corporate Outreach activities and accomplishments big and small!
Contact Dilip Shah,
165 Learning and Development Chair
emc3solu@aol.com

tconder@mmm.com
Help Support
MEASUREMENT SCIENCE EDUCATION AND OUTREACH

Developing measurement education and outreach resources to inspire the next generation of measurement professionals.

เช็คชิ้น support for schools with measurement science programs.
✓ Multimedia resources, measurement kits, technology and career resources.
✓ Promotional material promoting measurement science and careers in metrology.
✓ Education and training resources for current and future metrology professionals.

NCSLI is a 501(c)(3) charitable nonprofit educational organization. All contributions to the Education Development Fund (EDF) are tax deductible in the U.S.

Anyone! Can contribute directly to the Education Development Fund (EDF) at www.ncsli.org. Federal employees can contribute through the Combined Federal Campaign CFC Code 26683.

Contribute today!
One of the most unique and sophisticated pressure sensors is the fused quartz bourdon tube or capsule. The fused quartz bourdon tube should not be confused with the quartz resonator pressure sensors, which use quartz crystals and are currently designed and marketed by companies such as Paroscientific and Quartzdyne. Fused quartz tubing is manufactured by melting naturally occurring high purity quartz crystals at approximately 2000 °C and then extruding the melted quartz into various diameters and wall thicknesses. This type of tubing is transparent and looks almost like glass.

Some of the early development of the quartz bourdon can be traced back to Sam Worden, who was most noted for his pioneering work in gravimeters. The Worden Gravity Meter has the capability of measuring relative gravity to 1 part in 100,000,000 or a difference in elevation of only 1 inch. Before Sam Worden started fabricating quartz bourdon tubes at Worden Labs for Ruska Instruments (early 1960s), he built some low resolution models for use in scientific labs. Walter Ruska, the founder of Ruska Instruments, left Ruska before any development or engineering efforts were started at Ruska on quartz measuring instruments.

Why fused quartz? Many would ask why fused quartz was chosen to be a pressure sensing element. Dating back to the use of fused quartz in gravimeters, it was well known that it made an almost perfect spring material. Since fused quartz had a very low coefficient of thermal expansion, low thermoelastic modulus and low internal viscosity the “stage was set” to use fused quartz as the breakthrough bourdon material. The metallic bourdons – such as beryllium copper, phosphor bronze, 316 stainless steel, NiSpan C, etc. – could not compare in terms of hysteresis, resolution and repeatability. Early work by K.R. Bodenstein, J.B. “Pete” Damrel and others indicated that it was possible to fabricate a bourdon tube from fused quartz.

In 1962 Willard E. Buck received a patent for a precision barometer that used a quartz bourdon as the pressure sensing element. The key design objectives were higher resolution and improved portability. The fate of this particular patent and design relative to commercialization is unknown.

In 1953 Texas Instruments (TI) in Houston, Texas acquired Houston Technical Labs from Sam Worden. At TI, design and development efforts by J.B. “Pete” Damrel Jr. and Jerry Fruit led to the introduction of the Model 140 and 142 in the early 1960s. The brochure for the TI “Fused Quartz Precision Pressure Products” (dated January 1964) announced “New Concepts in Precision Pressure Measurement and Control.” These breakthrough pressure instruments were targeted at the existing market for mercury manometers and dead weight testers. The measurement instruments were the Model 140 (manual gauge) and the Model 142 (motor-driven gauge). TI’s new products offered improved resolution, respectability, hysteresis and portability over conventional pres-
sure measuring instruments in the early 1960s. The resolution of these original TI instruments was 1 part in 100,000.

At the base of the quartz bourdon tube was a mirror that was used to detect the position or deflection of the bourdon tube when pressure was applied. A light source aimed at the mirror reflected back to a pair of photocells that indicated the amount of angular deflection of the bourdon tube. A mechanical digital counter would indicate the amount of offset from null. The counter reading multiplied by a scale factor provided a number that was proportional to the pressure applied to the bourdon tube. The TI 140 Series quickly found applications in avionics, calibration laboratories, and other applications that required a high level of accuracy and performance. The early TI bourdon capsules were capable of measuring pressures up to 500 psi and could be used to measure gauge, absolute or differential pressure. The reference side (or area surrounding the bourdon) could be at atmospheric pressure to measure gauge pressure or at an elevated pressure to measure differential pressure. Absolute pressure measurement could be achieved by connecting a vacuum pump to the reference port of the bourdon tube or by using a bourdon tube that was permanently evacuated. Another important TI product introduction was the precision pressure controller that could provide automatic pressure control or generation. The new TI models LPC50, LPC100 and model PSR100 were designed to be used in conjunction with the TI Precision Pressure Gage. The Model PSR100 had the highest control pressure capability with a maximum output (or control) range of 100 psig. The quartz bourdon tube was designed to be interchangeable so that the end user could easily install and remove different pressure range tubes. The TI “Precision Pressure Gauge” was patented in 1966 and marked the first commercialization of a precision fused quartz bourdon tube.

Ray Worden, Sam Worden’s nephew, joined Ruska and conceived the idea of the Ruska “Electro-Null Pressure Standard.” The Electro-Null was Ruska’s first high performance pressure instrument and Lloyd Linton was responsible for the mechanical design of this product. The pressure sensor was similar in appearance and design to the TI sensor, in that the quartz assembly was enclosed in a glass housing. The Electro-Null had a quartz bourdon tube, a long quartz fiber that ran down the center of the bourdon tube, photocells and a motor to null the output signal. At about the same time, Ruska developed and marketed the Perma-Quartz, which was a quartz bourdon tube mounted in a circular dial gauge. Attracted by a lucrative Air Force contract, Ruska’s next precision pressure instrument was the XR-38. The pressure sensor was similar in appearance to the TI sensor, in that the quartz assembly was enclosed in a glass housing. Lloyd Linton (Chief Engineer) teamed up with Ray Worden to design the quartz bourdon tube for this next generation Ruska product - the XR-38 – which was introduced by Ruska to the precision pressure market in 1968.

In the late 1960s Texas Instruments introduced its second generation of quartz bourdon instruments, which was the TI-145 (gauge) and TI-156 (controller). With TI’s focus on hand-held calculators, integrated circuits and other fast developing markets, it was difficult to obtain funding for the Pressure Instruments Division. Jerry Fruit made the decision to leave TI and start a new company dedicated solely to precision pressure instruments. This new company would be named Mensor. Most of the Mensor founders worked at TI in the pressure instruments...
group including the engineering, production and sales departments.

Mensor Corporation was founded in 1969 to take the fused quartz sensing technology to the next level of performance. The Mensor “sensor” was similar to the design of the TI capsule in that it also used optical sensing in order to eliminate any friction or thermal effects being applied directly to the quartz bourdon. A small circular mirror, attached to the quartz bourdon, reflected a light back to the photocells. When pressure was applied to the quartz bourdon, the mirror would rotate relative to the magnitude of the pressure applied and produce an offset voltage or error signal from the photocells.

The Mensor fabrication process started with high purity quartz tubing (for example, 8 mm OD by 6.5 mm ID). A custom lathe and a set of torches were used to wind a hollow quartz spring or bourdon on a carbon mandrel. The torches were used to soften the quartz tubing such that it could be wound or formed into a helix which would eventually be about 28 to 30 coils on the final assembly. The exact pressure range was determined by the size of the tubing, the speed of the lathe, the feed of the lathe and the amount of back pressure applied to the inside of the tubing. Different pressure ranges had different cross sectional areas and different wall thicknesses. Adjustments to the exact pressure range could be accomplished by etching the quartz spring with hydrofluoric acid. The helical quartz bourdon would then become an integral part of a complete bourdon assembly that included; (a) quartz mirror, (b) quartz tension spring, (c) mounting block, (d) housing, (e) pneumatic fittings and (f) glass sleeve. All of the quartz components were fused together into a single quartz assembly. It is easy to see when one looked at the intricate quartz bourdon assembly why it is considered to be the work of a craftsman and almost a work of art.

The first product introduced by Mensor was the Quartz Manometer (QM) in 1969, followed by the Quartz Manometer/Controller (QM/C) in 1970. In the early 1970s the QM was used for metrology applications primarily in calibration labs, avionics and research. The QM as first introduced was not a direct reading instrument. Special interpolation charts were used to determine the exact pressure reading. Development work began early in the 1970s to produce a Mensor direct reading instrument. In 1972 Mensor introduced the first quartz bourdon pressure measurement instrument that had the ability to provide direct pressure readings in pressure units (i.e., in.Hg, mbar, kPa, etc.). The direct reading design developed at Mensor was patented and made the fused quartz bourdon instruments even easier and faster to use. In 1976 Mensor introduced a digital pressure gauge (Model 11600), which used a fused quartz bourdon in a force-balanced configuration. Whereas the Mensor QM and QM/C had removable capsules, the Model 11600 had a dedicated sensor that was not removable. Mensor also used the fused quartz bourdon in its second generation pressure controller (Model PCS200) in 1983.

In the early 1970s Ruska decided to develop their third generation pressure instrument employing a quartz bourdon tube also in force balanced design. This instrument known as the DDR-6000 was also direct reading and was designed for precision pressure measuring and controlling applications. The DDR-6000 quartz assembly was reminiscent of the Worden Gravity Meter quartz assembly in terms of complexity and physical appearance.

In the 1980s TI made the decision to sell the quartz bourdon pressure
products to Halliburton Geophysical Services. The TI pressure products were even sold for a few years under the Heise product label. After a short tenure at Halliburton the TI Pressure line was sold to Mensor in 1990. Therefore, many of the pressure instruments that were designed originally by the Mensor founders, when they worked at TI, found their way back “home” to Mensor.

At the beginning of the 1990s Mensor saw potential opportunities and advantages with silicon piezoresistive sensors and began development of a new line of pressure instruments. During the early 1990s Mensor continued to sell and service quartz bourdon products, including the TI products. By the mid-1990s Mensor had stopped all production of quartz bourdon instruments.

After a 50 year history of quartz bourdon pressure instruments, Ruska is now the only company that is still manufacturing and selling quartz bourdon tubes. In 1993 Druck acquired Ruska and three years later GE acquired Druck. While Druck continues to use the Ruska trade name, it appears that the both the Druck and Ruska products and models will eventually become GE labeled. The Ruska 7250 is now showing the GE PACE 7000 brand.

It is interesting to note that the three companies that capitalized on the fused quartz bourdon as a precision pressure sensing element were all located in Houston, Texas. The contributions of great minds like J.B. Damrel Jr. and Jerry Fruit at Texas Instruments, Ray Worden, Kurt Solis and Lloyd Linton at Ruska and then Jerry Fruit at Mensor drove the development, design and commercialization of a technology that has spanned a period of 50 years and is still in use by Ruska today. This article is dedicated to these pioneers that forged the “technology trail” for the fused quartz bourdon tube in precision pressure instruments.

paul.neilson@mensor.com

Chronology:
1944 Ruska founded in Houston, Texas
1940s Sam Worden develops Worden Gravity Meter
1953 Texas Instruments acquires Houston Technical Labs from Sam Worden
1960 Texas Instruments introduces quartz pressure gauge (Model 140)
1960 Ruska begins quartz work at their new facility
1960s Ruska introduces the Electro-Null instrument and Perma-Quartz.
1960s Worden Labs began winding helical quartz bourdon tubes
1962 Patent issued to Buck on quartz bourdon instrument
1964 Ruska acquires Worden Labs
1966 Patent issued to Peter Damrel & Jerry Fruit at Texas Instruments
1968 Ruska introduces Quartz Pressure Gauge (Model XR38) and the Model 3820 Pressure Test Set
1969 Mensor founded in Houston, Texas
1969 Mensor introduces Quartz Manometer (Model 10100)
1970 Mensor introduces Quartz Manometer/Controller (Model 10205)
1972 Ruska introduces Quartz Pressure Gauge/Controller (Model DDR6000/6010)
1973 Patent issued to Jerry Fruit at Mensor
1975 Patent issued to Ray Worden, Kurt Solis & Lloyd Linton at Ruska for DDR6000
1976 Mensor introduces Quartz Digital Pressure Gauge (Model 11600)
1976 Mensor introduces Quartz Digital Pressure Transducer (Model 11603)
1983 Mensor introduces Quartz Pressure Controller (Model PCS200)
1980s Texas Instruments sells Quartz Product Line to Halliburton
1980s Ruska introduces Model 7000/7010's
1987 Mensor introduces Quartz Pressure Gauge (Model PCS100)
1990 Mensor acquires Quartz Product Line from Halliburton/HGS
1990 Halliburton sells Worden Gravity Meter Co. to Bob Neese
1992 Mensor discontinues manufacture of all quartz sensors products
1993 Druck acquires Ruska
1996 GE acquires Druck
2006 WIKA acquires Mensor
In NCSLI’s quest to become an IACET (International Association for Continuing Education and Training) Authorized Provider a group of us from the Learning and Development team met in Boulder, CO November 17–20, 2009 for an initial internal assessment of what we have in place, and of course what we don’t! You will see a number of changes in the coming year in our effort to become compliant with the ANSI/IACET standard for offering continuing education units.

Instructor Qualifications

One area of the IACET (Section 6.1) requires that we collect biographies (and resumes, or references) from our instructors for all qualified learning events.⁠¹ A well-crafted biography for one of our learning events will contain three elements:

1. Summary of competency in the learning event content.
   Describe your expertise in the subject matter.
2. Credentials/Training in planning or facilitating a learning event.
   List any teaching certificates, courses in teaching/instructing, attendance at Train the Trainer sessions, self study or job responsibilities related to teaching. List any professional certifications from organizations such as the American Society of Training and Development, branches of the military, or any certifications from training organizations.
   There may be some overlap in the content of knowledge defined by number 2 and 3 in this list. Number 2 is focused on certifications and number 3 focuses on knowledge of instructional and learning methods (which could be gained by activities in number 2).

I recently completed a reference for someone planning to teach at a university. The form required me to submit comments on these categories:

- Knowledge of the above subject (the course and description were listed)
- Teaching Ability
- Under what circumstances and for how long have you observed the competency of the above-named person
- Additional comments.

This approach (using references) might be another useful tool we can use to document the qualifications for our NCSLI instructors. Your ideas and input would be helpful in designing a system that meets the criteria and our metrology profession.

Professional Development

Section 6.2 of the ANSI/IACET criteria requires the following:

“Individuals involved in developing and delivering learning events participate in professional development and training activities to maintain competency in subject matter materials and learning methods.”

A couple of key points are noted in the Interpretation section here. The Provider (NCSLI) must have specific sets of competencies (need) and a documented evaluation process (have). This is quite common in many fields where someone is licensed or certified. So what might we include in a documented professional development policy for our instructors?

- A number of hours of continuing education each year?
- Participation in an on-line webinar or meeting to discuss the instructional policies?
- A form that instructors can use to document their ongoing development activities?

---

¹ Our NCSLI learning events might be a conference session, a tutorial, a regional training event, or a well designed/defined section meeting (conducted as a training event).
Also, how might you conduct a self-evaluation of your competencies to determine where you want to focus your efforts? We have a couple of items posted on the new website that may be useful to you. Again, your ideas and input would be helpful in designing a system that meets the criteria and our metrology profession.

**NCSLI Resources**

While we are busy developing a system for documenting qualifications and professional development, there are things you can do now! Here are some ways NCSLI can help you further your professional development. We have a number of resources and opportunities currently available and more will be coming in the future.

**Training Aids Library Resources**

A number of resources on education and training are available in our Training Aids Library. All of these materials can be checked out by our NCSLI Member Delegates (FREE). A best practice would be to include review of one of these publications in your professional development plan for this year. (Abstracts of these items will be coming in 2010.)

- **How To Measure Results**
- **The Bottom Line On ROI**
- **Evaluating Training Programs**
- **Lost Knowledge: Confronting the Threat of an Aging Workforce**
- **Return on Investment in Training & Performance Improvement Programs**
- **Train the Trainer: Foundations and Delivery**
- **Train the Trainer: Instructional Design and Implementation**
- **Train the Trainer: Measurement and Evaluation**
- **Managing the Generation Mix**
- **Leaders as Teachers**
- **The Learning Advantage**
- **Evaluation Basics**
- **Succession Planning Basics**
- **Succession Planning (ASTD Info Line)**
- **Knowledge Management (ASTD Info Line)**
- **Training and Learning Styles (ASTD Info Line)**
- **Teaching SMEs to Train**
- **How To Design & Present Technical Training With Impact**

**Train the Trainer Tutorials**

We held a one-day Train the Trainer session at the 2009 Workshop & Symposium in San Antonio. We covered “Writing Learning Objectives” and “Adult Learning Styles.” This year in Providence, RI we will have a half-day tutorial on “Writing Learning Objectives” and a full day tutorial that covers two key items from the IACET criteria:

- “Selecting Appropriate Learning Activities to Achieve Learning Objectives”
- “Assessment Methods for Adults to Measure Mastery of Learning Objectives”

Learning activities include things like brainstorming, team discussions, making measurements, brief presentations, writing a brief essay (in a writing class), giving a brief presentation (in a presentations class) and so on. As I’m sure we all know, adults absolutely hate being lectured at for hours on end. When we talk about assessment methods, the first thing that comes to mind might be a quiz! Well, most adults also have fear of quizzes and tests. So, we often need other creative ways to determine if the student is actually learning what we established as outcomes for the learning event. Examples of other kinds of assessment methods include integrating evaluation of a measurement result with a measurement activity, feedback to the group on the brainstorming list, peer-review of essays and presentations, and so on.

Please consider signing up for one of these tutorials. Don’t wait! Since they will be offered on the Friday and Saturday before the conference, you’ll need to make sure you include attendance in your travel plans. The course is FREE for NCSLI tutorial instructors.

**NCSLI Website**

On the new website, we have a “Trainer Resources” page which you can access from the top of the “Learning and Development” page. There are links to two self-assessments that can help you identify what professional development efforts you would like to pursue. A great way to start out 2010 might include creating a professional development plan that focuses on your education and training qualifications!

We hope to expand and regularly update the resources posted here, so if you have some good references, pass them along.

**Regular Tips for Trainers**

As I noted earlier, I plan to have a regular column on this topic with additional references and links to our website. If you have ideas or questions you would like addressed – drop me a line with the suggestion! We can all improve our teaching by sharing best practices, so if you’d like to be a guest columnist - let me know that too.

gharris@nist.gov

---

**Measurements International Training Seminar**

**DAY 1 6010 Series Automated Resistance Bridge**

**DAY 2 6000B Automated High Resistance Bridge**

MI-Florida will be hosting on February 10th and 11th, 2010
MI-Europe will be hosting on March 3rd and 4th, 2010

Our training seminar is designed for beginners to advanced metrologists. For more information on the overview, location and registration, visit our website at www.mintl.com
The Braunschweig International Graduate School of Metrology (IGSM) was established in 2007 by the Technische Universität (TU) Braunschweig, and the Physikalisch-Technische Bundesanstalt (PTB) as a worldwide visible, unique training center for the science and application of traceable measurements.

by Dr. Dezhen Li
Course Director

The Technische Universität Braunschweig focuses on scientific-technical fields with a strong need for metrology. Three departments combine their expertise in the graduate school: The Electrical Engineering, Information Technology and Physics department, Life Sciences department, and the Mechanical Engineering department.

The Physikalisch-Technische Bundesanstalt (PTB) is the national metrology institute (NMI) of Germany. It was the first such institute to be established in the world and covers 40% of the total R&D spending of all European metrology institutes. On its 1 km² site in Braunschweig, the PTB operates a number of worldwide unique facilities, mostly related to the primary implementation of the SI units. The PTB contributes to the graduate school with scientists and engineers with many years of experience and exceptional equipment. The TU Braunschweig provides all the necessary training capabilities. Both institutions provide excellent research opportunities. This combination makes Braunschweig a unique place for metrology.
The graduate school is considered the seed of a structural, long-term cooperation between the TU Braunschweig and the PTB on a new level of intensity.

As reflected in the name of the school, three characteristics are combined: metrology, the science and technology of traceable measurements as an interdisciplinary field with a common, rigorous methodology, guides the curriculum and scientific program. Metrology aims at international harmonization and the school thus has a pronounced international approach. Finally, with a strong metrology-related research focus of the TU Braunschweig and the PTB, Braunschweig is the first-choice location for such a graduate school.

Our Organization
The graduate school is headed by a Management Board, which is assisted by a Course Director, and advised by an International Advisory Board. The Management Board consists of the speaker, five representatives from the TU Braunschweig, two representatives from the PTB and two Ph.D. students. The Management Board is responsible for the successful operation of the IGSM, including all scientific and teaching activities, recruitment and selection of the students, selection of doctoral thesis subjects, as well as financial matters, and public relations.

The Course Director coordinates and supervises the curriculum. These tasks include: the coordination of the recruitment process, coordination of various lectures and courses, internships and lab rotations. The Course Director is the main contact person and supports the scholarship holders. The International Advisory Board consists of leading experts in the field of metrology, coming from other national metrology institutes (NMIs), universities and industry. They advise the school with important and strategic questions. Furthermore, the International Advisory Board is involved in the career plans of the students and assists in identifying employment opportunities for the students.

Program and Curriculum
The structure of the IGSM is divided into two focus fields: Industrial Metrology and Fundamentals of Metrology. Industrial Metrology consists of metrology for production, metrological instrumentation, and Nanometrology and is devoted to innovative concepts for the measurement infrastructure according to the demands of industry and trade. It includes topics such as inline metrology, production engineering and next-generation electronics and other micro and nanosystems.

Fundamentals of Metrology consist of: Metrology in Life Sciences, Quantum Metrology, and Precision Experiments. It comprises all fun-
damental research aspects related to the implementation and dissemination of the units. Research efforts aim at utilizing quantum effects and universal physical constants to implement next-generation primary standards.

The curriculum of the graduate school comprises the mandatory lectures Foundations of Metrology, topical courses, and courses for general and soft skills, language courses, lab rotations and a summer school. This curriculum is supplemented by internships in local industrial calibration laboratories for students in the focus field Industrial Metrology, and by guest researcher opportunities in renowned research laboratories abroad for students in the focus field Fundamentals of Metrology. The lectures and courses are held in English.

The lectures Foundations of Metrology cover the basic metrological methodology, an overview of the base and derived units, state-of-the-art technologies, how to implement them and the global measurement system. It aims at a common, broad and comprehensive metrological background and helps to overcome the fragmentation of the topics in the natural and engineering sciences.

The Summer School of Metrology takes place at attractive places around Braunschweig every two years and lasts about one week. It took place for the first time in 2008, with Nobel Prize winner Klaus von Klitzing as one of the lecturers. Leading international speakers are invited to give lectures on the latest advances in Metrology. The summer school gives the students an opportunity for international networking and integration into the metrological community.

Summer semester lectures are held on Foundations of Metrology for the Ph.D., student members of the Braunschweig IGSM, includ-
ing Methods of Metrology, Nobel Prizes and Instrumentation. In the winter semesters, “Foundations of Metrology” is usually given as block lectures with contributions from the student members on current topics of metrology.

Field trips are supported by our industrial partners. Visiting these companies is very interesting and useful for the Ph.D., students of the IGSM.

Recruiting
An approved recruitment process is an important factor for the success of the graduate school. For this purpose, new online applications started in May 2009. Many Ph.D. students from all over the world applied for topics specified by the principal investigators. The applications are rated by means of a point system. English skills, personal impression, scores of Bachelor and Master studies, duration of studies, research and work experience, prior knowledge and the number of publications are important criteria for the selection process.
There’s a classic pop culture metrology reference in the movie *Pulp Fiction* when John Travolta explains that a McDonald’s *Quarter Pounder* with cheese has a different name in France. In France, it’s called a “Royale with cheese.” Why? Because as Travolta’s character puts it, “they have the metric system in France and they wouldn’t know what the &*$%&! a quarter pounder is.” Fast food gets its name because it is served fast, but that scene reminds us that it’s always marketed by size.

If you don’t think that size sells fast food hamburgers, consider that the *Quarter Pounder* is a food item whose name tells you how much the hamburger patty weighs. Not all hamburger names get that specific, but their names always suggest that they are BIG. For example, McDonalds also serves the iconic *Big Mac* (two all beef patties, special sauce, lettuce, cheese …) and the Double *Quarter Pounder*. Burger King has *The Whopper*. Carl’s Junior has *The Big Carl*. Sonic has the *Super-Sonic*. Best known for ice cream, Dairy Queen has the Half Pound Flamethrower Grillburger. Good Times has the Big Daddy Bacon Cheeseburger and the Mighty Deluxe. Wendy’s has the Three Quarter Pound Triple. Jack in the Box has the Jumbo Jack. Hardee’s has the Big Hardee and the best name of all, the Two-Thirds Pound Monster Thickburger. Taste Freeze (hard to find nowadays but immortalized by John Cougar Mellencamp in his song *Jack & Diane*) has the Big Tee and the Big Country. In-N-Out Burgers has the 4x4, which not surprisingly has four hamburger patties and four slices of cheese. The biggest burger of all might be Fatburger’s XXXL Triple King, with a total weight of a pound and a half. And while IHOP isn’t considered a fast food restaurant, I have to pay my respects to their Monster Cheeseburger. If you get carried away and decide to eat one of those, make sure to stay up for at least six more hours and then keep the Zantac handy just in case.

Size also sells other types of fast food. Subway came up with a bit of marketing brilliance with their *Five Dollar Foot Long*. What a great name! With four little words they tell you how much it costs and how long it is. I wonder what they call a *Five Dollar Foot Long* in France?

Big burrito places are the current rage, but Del Taco was a pioneer in that area some years ago. In fact, they used to sell their burritos by weight, and the *Macho Burrito* still checks in at over a pound. If you pull through the drive up at Del Taco and order four or five *Machos*, you might have flashbacks of the scene from *The Flintstones* where the carhop brings a slab of ribs and tips Fred and Wilma’s car on its side.
How about fountain drinks? In the old days, nobody would drink more soda than a 12 ounce bottle would hold. Nowadays, drinks come in containers that hold enough liquid to support a small school of guppies. Perhaps the most famous big drink is the Big Gulp sold by 7-11, which holds 32 ounces of soda, or 1 liter in areas (like France) where they use the metric system. You’d think that a Big Gulp would satisfy the thirst of just about anybody, but many consumers opt for the Double Big Gulp, which holds 64 ounces or 1.9 liters. Some gas stations and movie theaters carry even bigger fountain drinks, sometimes 72 or 80 ounces, more liquid than a six-pack of beer! Some of the cups you get at gas stations are great inventions and worth keeping, not really cups but essentially buckets with cup handles. Home Depot could sell millions of them. I once used one to bail water out of a basement window well during a rain storm.

The way that fast food makers use measurement units to describe their products is really interesting. For example, when they want to make something sound big, they talk about pounds, not ounces. Can you imagine John Travolta walking up to the counter and ordering a Four Ouncer with Cheese? That sounds really wimpy. No self respecting fast food junkie would order one of those. Ironically, when Britain adopted the European Union’s metrification laws in January 2000, the legislation seemed to have meant that McDonald’s would need to change the name of the Quarter Pounder to something different, like the 113 Grammer. However, a spokesman for McDonalds at that time rejected the suggestion of a new name appearing on the menu. He asserted that Quarter Pounder is a “registered trademark name and not an indication of weight.” Whatever you say, buddy.

It’s even more interesting to note how fast food restaurants switch to the metric system when they talk about fat. When the subject is fat, the unit is grams, which everybody knows are little tiny things that you can’t even see. For example, a Triple Whopper with Cheese at Burger King has 84 grams of fat. That doesn’t sound so bad, but in reality it’s a lot of fat, almost one fifth of a pound. What if Burger King changed the name of the product to the Fifth Pound of Fat Burger? That sounds so yucky that sales would plummet. Hardee’s Two-Thirds Pound Monster Thickburger in addition to having the best name, also has the most fat (97 grams). Hardee’s could truthfully call it the More than a Fifth of a Pound of Fat Burger. For the record, 97 grams of fat is about equal to the fat found in eleven bean burritos at Taco Bell.

Speaking of fat, you would think that since fast food items can be so large, then the person who regularly eats fast food would get, shall we say, larger. My personal experience seems to support this theory, as does a quick look around the dining room at most fast food joints. In the 2004 documentary Super Size Me, a fellow named Morgan Spurlock ate three meals a day at McDonalds for 30 consecutive days. Spurlock gained 24.5 pounds during the experiment, or more than 13% of his body weight. His cholesterol went up by about 50% and he suffered various other ailments. If you are a fast food junkie, one viewing of Super Size Me will probably cure you. It drives home the point that a regular fast food diet is not beneficial to either your health or your waistline.

Healthy fast food would probably sell pretty well, don’t you think? I mentioned earlier that Subway is a brilliant marketing company. Long before the Five Dollar Foot Long, they convinced America that you can lose weight by eating fast food. Their main advertising spokesman is a pop culture icon named Jared Fogle, who weighed some 430 pounds while a student at Indiana University. He dropped a staggering total of 240 pounds by going on the “Subway Diet,” which consisted of exercising more and eating both lunch (a 6-inch turkey sub) and dinner (a foot long veggie sub) at Subway. The story has its doubters, as does the validity of the “Subway Diet,” but it seems to be basically true. If you go easy on the mayo and other condiments, you would have to eat about 27 of Subway’s 6-inch turkey subs to get the same amount of fat provided in a Two-Thirds Pound Monster Thickburger. Of course, in addition to the exercise, the main reason Fogle shed so many pounds was not specifically that he was eating at Subway, but because he reduced his food intake from 10,000 to 2,000 calories per day.

I don’t know about you, but all this talk about fast food is making me hungry, and the drive-up window at Taco Bell is still open. Bring on the night! I’m ready for the fourth meal.
The 151 Healthcare Metrology Committee met during the NCSLI Conference in San Antonio on Monday, Tuesday and Wednesday. There was a brief introduction by Marcus McNeely, welcoming all new and returning participants to the meeting. Business cards were handed in and an attendance sheet was completed by the participants. The participants all introduced themselves and the meeting commenced.

An update was given to the group on the 17025 Traceability Subcommittee. It was communicated that a draft document was completed and is in review before being sent to the 151 Committee for further review. Additionally, the document will be reviewed for “FDA Readiness” prior to forwarding to the proper parties in the agency. The document focus is upon an existing draft guidance document from the FDA, titled “Draft Guidance for Industry Submission of Laboratory Packages by Accredited Laboratories.” Essentially, this document contains all the components required (if they were applied to accredited calibration labs) to fulfill the scope of the 17025 Trace Subcommittee. The target date for the draft guidance to be sent to the 151 Committee is late summer 2009.

An update was given to the committee on the ICH Subcommittee work. It was noted that an initial inquiry on the specificity of the Q1A standard (specifically, the environmental conditions) was forwarded, to the ICH Secretariat in Geneva. As of the conference, there was no correspondence returned from ICH. The response from ICH would drive the scope of further work on the committee, which could simply mean clarification of the requirements.

A discussion was held to cover committee goals, conference panels, tracks and related abstract submissions. Marcus McNeely stated the importance of expanding the existing sessions at NCSLI. The benefits included:

- Greater attendance of the NCSLI conference by healthcare metrology professionals.
- Stronger justification of would-be attendants due to consistent number of abstracts on healthcare metrology topics.
- Greater 151 participation.

It was noted by many participants that continuance and expansion of existing sessions was desired, and a theme for each session would best serve the audiences.

Jay Bucher (Bucherview Metrology) noted that the current national focus on healthcare provided a springboard for interest.

Joe Petersen (Abbott Labs) suggested the following session theme (or similar), which was very-well received by those attending:

“Reducing Costs on Healthcare (Metrology) While Maintaining Quality”

To that note, Marcus McNeely and Jay Bucher committed to compiling abstracts for the 2010 Conference. One more abstract will therefore fill a session, and three more abstracts would create two sessions. Marcus McNeely (Blue Mountain Quality Resources) mentioned that process analytical testing to determine proper guard-banding would likely be a focus in his abstract.

Dean Ripple (NIST) mentioned risk based analyses as a viable topic within this theme, which was also well received by the committee. It was noted in general that an effective risk-based approach inherently reduces costs, as efforts are focused on appropriate areas. Michael Linn (Johnson Controls) noted the possibility of finding internal resources in his organization to assess an abstract for risk analyses.

Bill Moses mentioned the education of customers and its role in cost reduction as well.

Tom Steinmetz (Eli Lilly) offered information on a cost-reduction paper.

It was noted by Marcus that we would need to have abstracts completed at least one month prior to the NCSLI deadline for submissions for the 2010 conference in Providence.

Jay Bucher indicated his interest in spearheading a new subcommittee for the proposition of guidance documents to help align the FDA with respected metrology practices. He had already commenced communication with Emir Galevi (FDA Liaison) to that effect, and has stated a number of items to include in a new proposed guidance document. This also appeared to be well received by those in attendance. Among the many items slated for topics were:

- 820.72(b)(2) – Clarification of the term ‘Records’ into Labels, etc.
- Lack of similar backgrounds in FDA (with metrological backgrounds), and the overall concerns of this prompting misinterpretation of the QSR’s.
- Mark Ruenenacht (Heusser Neweigh) – Presented on the proposed rewrite of ASTM E617 (Weigh Specifications and Tolerances).

It was noted that some of the proposed changes would pose some challenges with the OIML weight designations. There were general discussions of cost to the industry.

It was noted that the current ASTM standard is far behind in general. There was also a general discussion regarding USP 41 and the stalled rewrite of that standard. It was also noted that it was very difficult for healthcare industries to work around USP standards.

George Rodriguez mentioned using current weight designations in the immediate future, followed by a deadline for their antiquation, as opposed to immediate replacement or continuation of their use alongside the OIML designations. In any case, the proposition of moving forward with OIML designations seemed well received by many in the meeting.

Additionally, it was noted that the ASTM 898 standard is also slated for revision, perhaps within a year’s time. One perceived adaptation is based upon an existing SIM standard. The NCSLI Metrology Online Forum was discussed as a carryover topic from July 28, where Dean Ripple (NIST) commented on the possibility of using the online forum as a means of implementing the NIST Workshop. This is one idea of many that could be implemented to augment the use of the forum. Per Dean, conductivity was a good starting point for both the workshop and forum.

Dean and Marcus will work together to set up such an area on the 151 forum.

mbmcneely@coolblue.com
Founded in the memory of Joe Simmons* to support the study of metrology and metrology-related quality topics.

**Outstanding students are encouraged to apply for the $3000 scholarship.**

Completed applications are due March 1.

For application forms or more information contact your advisor, student aid office, or the Scholarship itself at

Simmons_Scholar@comcast.net

www.simmons-scholarship.com

or write to: Simmons Scholarship
7413 Mill Run Drive, Derwood, MD 20855-1156

---

The Section held this year’s fall meeting at The Place off the Square in Newark, Ohio on October 22, 2009. The BioNetics Corporation, Newark Metrology Operations sponsored the location and continental breakfast for attendees. Twenty-three NCSLI members and two non-members attended the event. Mr. Ben Fuller, BioNetics Program Director, welcomed all attendees.

Ms. Dana Leaman presented a shortened version of her NCSLI conference tutorial “My Measurements are Traceable, Right? Demonstrating the Chain of Traceability.” Ms. Leaman is a member of the NCSLI International Board of Directors currently serving as the Vice President of Documentary Standards and discussed the activities from the October meeting. Ms. Leaman serves as the Program Manager with the National Voluntary Laboratory Accreditation Program (NVLAP) in the Information Technology Security Testing program.

During an open discussion period, the group discussed the topic of reduced National Institute of Standards and Technology (NIST) calibration services. A solution was offered that calibration laboratories may need to seek support outside of the United States. Next, the question of how calibration laboratories and auditors deal with instrument specifications that appear too good to be true. Attendees with auditing experience responded, “By asking the laboratory managers to prove (through demonstration) the claimed specifications or equipment Uncertainty by some form of Repeatability, Reproducibility study.”

Following the lunch period and group photo, Mr. Dilip Shah, President, E=mc² Solutions continued the program presenting Interpreting Instrument and Equipment Specifications. Dilip’s use of the imaginary “Cluck” unit helped attendees understand the presentation.

Mr. Graeme Payne of GK Systems, Inc. spoke next on the topic of Substituting Test and Measurement Equipment – Reasons, Methods, Cautions and Pitfalls. This shortened version of Mr. Payne’s NCSLI conference tutorial was very informative and offered many examples of historic aircraft.

Mr. Jeff Grossman, Fluke Inc., DH Instruments Division wrapped up the day’s program with a briefing and product demonstration for a New Solution for Hydraulic Gauge Calibration. The presentation included a brief overview of the traditional hydraulic piston gauge versus the new transducer based calibration standards.

The meeting was successful due to the NCSLI members and non-members in attendance. We have begun planning the April 2010 meeting and welcome input on subject matter our members want to see presented. Please contact me if you have any ideas. Thank you.

matthew.denslow@afmetcal.af.mil
The NCSLI International Carolina’s Section meeting was held on Thursday, November 19, 2009 at the Duke Energy, Technical Services Center in Huntersville, North Carolina. The meeting was hosted by Duke Energy, Calibration Solutions Inc., Southern Marketing Associates, and Mettler-Toledo. James Reid, North Carolina Section Coordinator conducted the meeting.

The plentiful breakfast, lunch and snacks provided during the day were donated by Calibration Solutions Inc., Southern Marketing Associates, and Mettler-Toledo.

Registration, breakfast and networking started the day. The registration included the distribution of documents and materials donated by NCSLI, the Fluke Corporation and MettlerToledo Inc.

Opening remarks were provided by James welcoming all to the meeting. As part of the normal Duke Energy employee’s day we reviewed safety points of the surroundings and reminded all to think about safety in all of their activities. The agenda and documents provided by NCSLI were reviewed and made available to the attendees. All attendees were given the opportunity to introduce themselves. An attendee of particular interest was Tiffany Lemmons from the UNC Charlotte, Center for Precision Metrology Research. Tiffany was a 2009 NCSLI Scholarship recipient.

The presentations began with Vernon Alt, Jr. Calibration Quality Manager, Northrop Grumman Corporation (NCSLI Mid-Atlantic Region Coordinator). Vernon presented an overview of the last NCSLI BOD Meeting including 2009 Conference Highlights and updates of committee activities. There was also a live review of the NCSLI website. Much discussion ensued about the focus NCSLI is placing on education programs such as the Education Liaison, Outreach, and the Metrology Ambassador Program with the Tool Kits. Vernon shared his experience working in the local schools and what rewards there are.

Based on the discussion, several attendees intend to pursue further information about the metrology education opportunities for local schools.

The meeting continued with a paper presentation by Mr. Bill Gaviria on “Estimation of Uncertainties in Electrical Measurements.” Bill provided a fast paced, but very detailed overview of measurement uncertainty and its components. Bill also volunteered and filled in one of the afternoon sessions with a presentation on Guard-banding. The presentation is a summary of work by Fluke corporate metrology manager, David Deaver.

Jason Pressly of Mettler-Toledo presented “Good Weighing Practice, Weighing the Right Way.” This was an in depth review of the many errors that can be induced by the set-up of a balance, the environment, operator, and procedural induced issues. When condensed; “96 % of weighing inaccuracies are due to human error, technical understanding and environmental influences.” This was an excellent review for balance users, as well as, technicians supporting customers’ equipment. Many of the points emphasized in this presentation also carry over to other types of Measuring and Test Equipment (M&T).

These are very brief descriptions of the excellent presentations these speakers provided. I encourage everyone to use these subject matter experts for their section meetings.

A door prize drawing was held using the returned meeting surveys. Door prizes included several items donated by NCSLI, and Fluke Electronics.

The day concluded with tours of the Duke Energy - Standards Laboratory by the laboratory technicians.

jsreid@duke-energy.com
The Twin Cities Section 1311 conducted its third meeting of the year on September 23, 2009. Our meeting was hosted by Boston Scientific and took place at their wonderful conference facility in Maple Grove, Minnesota. The meeting included five speakers, NCSLI 2009 conference summary, NCSLI BOD updates, a smattering of TV show trivia and concluded with numerous door prizes.

We had 107 attendees representing numerous companies and industries throughout the region. This was the second largest number of attendees for a Twin Cities section meeting in recent memory. We are very thankful for such an active and supportive NCSLI membership.

The Twin Cities section coordinator, Kevin Rust of MTS Systems Corporation, started the meeting with some initial introductions, welcoming everyone for attending and a quick round of 1970s TV show trivia. Next, Cory Otto, representing the Boston Scientific Metrology Laboratory, conducted a host presentation followed by an overview of Boston Scientific and the various roles and responsibilities of their metrology laboratory.

Our first speaker was Dilip Shah from E=mc³ Solutions who presented “Interpreting Instrument and Equipment Specifications.” Dilip provided an overview and examples of measurement related terms such as accuracy, precision, and resolution. As Dilip noted, the wide variety of instrument specifications formats presents many calibration challenges. Practical examples of specification formats and proper interpretation techniques were also presented and discussed.

The second speaker was Gary Hobart from Hexagon Metrology who presented “Video Measurement Standards and Technology.” Gary presented an introduction to the various aspects of ISO 10360 and application for verifying the accuracy of a CMM. Additional insight was provided regarding the development of ISO 10306 and its incorporation of aspects from ASME B-89.4.1 and the German VDI/VDE specification. Gary summarized with an overview of the first collaborative standard (ISO 10306-7) to include and specialize on vision systems.

Our third speaker of the day was Jerry Messman from Stranaska who presented “Analytical Metrology.” The role of Metrology in the analytical/chemical laboratory was certainly an eye opener to many of us in attendance. Jerry introduced us to the various applications of fundamental metrology practices in analytical, clinical, forensic, agriculture, food, fossil fuel and pharmaceutical sciences. In addition, the concepts of quality control, instrument calibration, method validation, proficiency testing, measurement uncertainty, measurement traceability and accreditation were presented with numerous examples. Although we may watch the various CSI television shows for entertainment, Jerry left many of us with new found appreciation for the role of metrology in analytical and chemical laboratories.

Terry Conder from 3M Corporate Metrology provided a summary of the NCSLI 2009 International Conference recently held in San Antonio and an update of recent NCSLI and Board of Directors meeting and activities.

After lunch, a little more TV trivia and a brief door prize session, it was time for our fourth speaker of the day. After an introduction to NAPT from Chuck Ellis, Carter Gay from NAPT presented “Proper Statistical Analysis of Inter-Laboratory Comparisons.” Carter provided an in-depth review of the various statistical analysis tools utilized by NAPT to identify bad data versus outliers. The statistical techniques used to establish proficiency testing reference values via reference laboratories or participant data were also presented. Carter also introduced many of us to the terms and concepts of “robust analysis,” “weighted mean” and the “mean method.”

Our fifth speaker was Lee Fletcher from The QC Group who presented “Geometric Dimensioning and Tolerancing (GD&T).” Lee introduced us to the concepts, terms and common symbols associated with GD&T on prints and associated dimensional documentation. The challenges and costs associated with the lack of adequate dimensioning, proper datum references and the use of incorrect dimensional terms and symbols were also presented and discussed.

Our meeting was concluded with a final round of TV show trivia, a few final announcements and the door prize finale. I wish to thank Boston Scientific for hosting our meeting, all speakers, numerous door prize contributors, and the entire Twin Cities NCSLI section membership for their continued support and my fellow Twin Cities steering committee members for making this another successful and very well attended Twin Cities section meeting. Our next section meeting is scheduled for February 4, 2010 in New Brighton, Minnesota.

kevin.rust@mts.com
Nineteen people were in attendance at the Madison Section meeting held at Promega Corporation in Madison, Wisconsin. Promega’s Metrology Department sponsored the meeting and provided morning snacks and beverages, along with outstanding facilities.

The meeting got started by the Madison Section coordinator, Jay Bucher, who welcomed everyone, and opened the meeting by having all the attendees give their name, company and what they do. After the introductions, the program got underway.

Our first presenter was Tim VonderHaar from Western Environmental Corporation, and his presentation was entitled “Laboratory Planning and Design.” His abstract gives a great overview: At some point in the future, when the economy has settled and the dust has cleared, companies may once again begin to spend money on capital projects. Whether you are building a new laboratory or updating your current laboratory, there are many things to take into consideration to ensure a successful project. This presentation will cover some of the basic aspects of laboratory design and highlight the areas of importance when it comes to planning for a new lab. There were several questions and it was evident that a lot of what was presented is never considered unless one is actually building a new lab. Thanks, Tim, for the informative presentation.

After a short break, our next presenter, Dip Shah from E=mc³ Solutions, (NCSLI Marketing Liaison-164.2), helped break what we believe to be new ground, with the assistance of Keela Sniadach and Promega Corp., in doing presentations at an NCSLI section meeting. Web 2.0! Dip’s presentation “Interpreting Instrument and Equipment specifications,” was very informative, as usual, but covered in such a way that brought home to those in attendance the importance of understanding specifications, tolerances and readability when working with determining test instrument tolerances. We followed Dip’s PowerPoint and audio presentation on the screen at Promega in Madison, while Dip sat home in Ohio. Through a telephone hook up, we could ask questions and exchange information in real time. What a way to communicate and educate in the 21st Century. There can be no doubt that this form of making presentations is the wave of the future - in reducing travel and hotel costs, dealing with inclement weather conditions, and time/business constraints. Thanks again to Dipil and Keela for setting the bar at a new level.

After Dip’s presentation, door prizes were drawn and the group picture was taken. We would like to thank Bucherview Metrology Services, 3M, and Promega Corporation for providing door prizes. Everyone received something, a trend that has been around since the section was started back in 2000.

After lunch, Terry Conder from 3M (NCSLI Conference Management VP) gave a presentation entitled “TECH, TWIST and Visiting Wizards – Educational Outreach Programs for Students and Teachers.” Many questions were taken by Terry as those in attendance seemed invigorated by his presentation and dedication to education and training. Terry gave this presentation at the Workshop & Symposium in San Antonio, and it had as much punch today as it did in July. Thanks, Terry, for keeping us motivated.

Then Jay Bucher, Bucherview Metrology Services (NCSLI North Central Region Coordinator and Madison Wisconsin Section Coordinator), gave an update on the latest NCSLI Board of Directors meeting this past October. He followed that with information on the status of the NCSLI 151 Healthcare sub-committee on writing an FDA guidance document on “defining and providing examples of definitions for calibration programs.” This was followed by a tour of Promega’s Metrology Department by Karl Wigdal.

We would like to thank Tim VonderHaar and Terry Conder for giving freely of their time and knowledge to help make this section meeting be a success, and for traveling all the way to Madison. Of course, we are honored to be at the forefront in supporting Web 2.0 with the help of Dipil and Keela. Our next section meeting will be in the spring of 2010, and we look forward to seeing everyone again.
A two-day Conference was held October 20–21, at the NRC (National Research Council) campus on Montreal Road in Ottawa, Ontario. More specifically we were in building M-36, the home of INMS (Institute for National Measurement Standards) where there are many impressive labs and skilled researchers. There were approximately 80 attendees including 12 exhibitors who supported the meeting. Having 12 exhibitors at this venue was a record showing and we managed to find room for everyone.

We had let two years slip by without a meeting and decided it was time put something together in Ottawa. NRC-INMS graciously offered the M-36 venue so we started to put things together.

Ingrid Ulrich of Ulrich Metrology, had taken over from Wayne Sampson as our Canada Region Secretariat. She did a wonderful job of contacting members, helping put the agenda together, helping with obtaining speakers, gathering and processing registrations, and keeping everyone up to date as we moved through the process. Our host, NRC-INMS was extremely helpful with many aspects of this event as well. Overall organizing support, good attendance from staff, logistics and IT support, office support, providing presenters, and arranging tours – Thanks to all at NRC-INMS!! We were also fortunate to have Dr. Malcolm Smith, president of NCSLI join us for this meeting – and his birthday was on October 20th – talk about dedication!

To start things off Dr. Jim MacLaren, Director General for INMS, welcomed everyone to NRC-INMS and stressed the importance of such meetings and subsequent discussions around the science of measurement. Dr. Malcolm Smith was up next and gave us an update on NCSLI activities and encouraged members to attend the International Conference next July 25–29, 2010. Following that I welcomed everyone and gave a brief overview of plans for the next two days. There were ten presentations over the two-day conference with a wide range of topics.

Dr. Dave Inglis, Group Leader for the Electrical Standards Group at NRC-INMS, was our first presenter and discussed “Fundamental Constants in Electrical Standards.” This was an insightful look at the transition of SI unit references over the years and Dave provided a look at the current project at NRC involving the construction of the electronic kilogram known as the Watts Balance. Next, Scott Sabourin of IsoTech North America gave a presentation on some improvements made to thermometer cell technology entitled “Temperature Calibration – A New Concept.”

After our first coffee break, Kenneth Kochav of NRC presented “Transformer Calibration at NRC Using Thompson’s Method.” Ken discussed the improvements made in the past two years for these types of measurements and some goals for further improvement in the future. Before lunch we had Duane Brown, President of Measurements International, give a presentation on measurement uncertainty improvements made to a resistance bridge entitled “AccuBridge: A Self-Calibrating DC Current Comparator Resistance Bridge.”

The afternoon was set aside for Dr. Malcolm C. Smith, President of Wescan Calibration Services Inc. to give a condensed version of an award winning presentation he has done at the international meetings called “Effective Calibration Laboratory Management.” This interactive presentation was well received by the audience.

Thanks to Dr. Dave Inglis, we were able to finish the day with tours of four of the electrical labs at NRC-INMS. We got explanations on experiments being conducted with Josephson Junctions for DC and the AC Quantum Voltage Standard, the Quantum Hall Resistor, and a unique look at a microwave power measurements using laser cooled atoms. At 6:00 PM, we all met for cocktails and a great supper at Mamma Tessa Ristorante in downtown Ottawa.

The next morning we got started with “Calibration Intervals, A Manufacturer’s Perspective” by Jack Somppi of Fluke Corporation. Jack gave an interesting perspective on different ways to evaluate calibration intervals in terms of cost and associated risk. Derk W. J. Duermeyer of QETE (Quality Engineering Test Establishment) gave a well-received presentation entitled “Electro-Optics – Calibrating NVGs and Thermal Imager Systems.” This presentation contained an interesting human element about visual perception and Derk injected the perfect amount of humor to make this an audience favorite. “Use of a Single High Speed Analog-to-Digital Converter for Precision Measurements of Three Phase Electrical Power” was
presented by Andrew Wachowicz of Measurements International. Andrew explained the challenges of an ongoing project which attempts to simplify three phase measurement using one standard while maintaining or improving the measurement uncertainty.

After break, Kai Wendler of NRC-INMS, presented a paper called “Resistance Calibrations.” Kai walked us through the steps taken in the past few years explaining how his lab made significant improvements to resistance measurement uncertainty through measurement automation and methodology improvements. The final presentation of the meeting was given by Kevin Bull, President of Veriteq Instruments. It was entitled “Measurement of Environmental Temperature & Humidity – Why Care?” Kevin is an enthusiastic speaker who enjoys interacting with the audience while making his points about these types of measurements and how they impact all lab environments.

Just before lunch, Dr. Malcolm Smith put on his president’s hat and took a few minutes to make some important announcements. The most exciting being the NCSLI endorsement of a scholarship fund known as the “Anthony Ulrich Scholarship for Metrology Excellence” in memory of Anthony Ulrich, President of Ulrich Metrology Inc., who lost his life in a tragic accident in January of 2004. Anthony was an active member of NCSLI and was passionate about his work in metrology and was an enthusiastic participant in all our meetings. For those of us who knew and worked with Anthony, this is a most appropriate and fitting way to remember our colleague. The ad hoc committee responsible for this accomplishment is made up of Dr. Malcolm Smith, Ingrid Ulrich, Graham Cameron, Jim Mullins with some special support from Pat Stuart of Fluke Canada. There were some generous donations and the seed money is now in place. The focus of the award will be on technical students in the field of metrology and will start out in the Quebec Region where Anthony’s company is located with the aim to eventually expand in the entire Canada Region. There is still work to be done but this was an important milestone.

Also announced was that Hydro Quebec confirmed that they would host our next meeting next fall. This would take place at their facility just outside Montreal. Thanks to Benoit Bouchard, manager of the calibration lab at Hydro Quebec, for soliciting this support. Malcolm wrapped things up by thanking everyone for coming and mentioned that he looks forward to seeing us all at the International Meeting next July in Providence, RI.

Over the two-day period, special thanks were given to several people who had helped with the organizing of the meeting. Each of the attending coordinators were recognized for helping with the introductions and event planning – Ingrid Ulrich, Wayne Sampson, Robert Armand, and Sylvain Bérubé (Sylvain will be taking over from Robert as Quebec coordinator) Individuals from NRC-INMS, and other companies were recognized for their contributions. Carlo Rea and Linda D’Amario of Technel Engineering Inc. were recognized for arranging the exhibitor portion of the meeting. All the presenters were, of course, recognized for their contribution. It was also noted that we had representation at this conference from across Canada that covered from Halifax to Vancouver which made for a truly national conference.

After lunch many attendees stayed to tour three unique labs on the NRC Campus - The Wind Tunnel, the Radiation Standards Laboratory, and the Optical Frequency (Laser) Laboratory. We divided into three groups and spent 30 to 40 minutes at each location learning many interesting facts about the respective research and experiments being done in each lab. At the end of the tour everyone headed out to begin their journey home. I believe everyone agreed that we had a very successful two-day event.

[jmullins@pylonelectronics.com]
HELP US KICK OFF THE 50TH YEAR OF NCSLI. We will be conducting a “50 year challenge” competition in 2011 to identify the top resources for making the case for metrology. Submissions may be in any media and must be suitable for public presentation. Three finalists will have an opportunity to present their “Case for Metrology” during our 2011 Workshop & Symposium.

The goal of the award is to gather real-life examples that support the positive value of metrology and calibration practices. The 2011 NCSLI 50 Year Challenge Award challenges you to present quantitative data that support the benefits of metrology and calibration. If you clearly show the positive impact of metrology, then consider competing for the $3,000 first prize!

Go to www.ncsli.org for more information
**Competition Rules**

**Content:** Submission must accurately address, in detail, the positive impact of metrology and calibration and must contain supporting data.

**Eligibility:** The competition is open to anyone except current or former NCSLI International employees or current members of the NCSLI Board of Directors (or family members). Only one paper/project may be submitted by each author. Co-authorship is permitted.

**Originality:** Papers/projects must be original and not previously published, previously submitted to NCSLI, or under consideration anywhere. Author must have the right/license to use any illustrations, graphic material or photos contained in the paper.

**Format:** Any media is eligible. Papers must be between 3,000 and 5,000 words. Videos must be less than 15 minutes long. Charts, graphs, and images, etc., are encouraged (see Originality above).

**Language:** Only papers/projects submitted in English will be considered.

**Timeline:** Deadline for receipt of papers/projects is February 1, 2011.

**Submission requirements:** Content must be submitted electronically, and must be accompanied by an entry form. Submissions will be judged anonymously by a panel selected by NCSLI International. Since the judges must handle the papers without knowledge of the identity of the author, it is required that the paper/project itself show no identification. (Video contributions may be edited to cover credits.) Only the title of the paper/project should appear on the title page. The title, author’s name, and contact information must be shown on the entry form only.

**Selection Criteria:** All submissions will be reviewed and judged based on demonstration of the impact of metrology/calibration, the presentation of tangible value (cost savings, efficiencies, global use, etc.), and the inclusion of support data and background information. Only papers/projects that comply with the competition rules and requirements will be presented to the judges. Judges’ decisions are final.

**Publication:** Each contestant grants publication rights and assigns copyright to NCSLI International. The winning papers/projects (and perhaps others) will be published in NCSLI’s Measure journal and or Metrologist magazine and possibly elsewhere.

**Prizes:** Cash prizes will be awarded to the author(s) listed on the entry form. First prize $3,000, second prize $2,000 and third prize $1,000. Co-authors will share cash awards equally unless both agree otherwise in writing. In addition, award plaques will be presented to the authors of the top three winning papers. NCSLI International is not obligated to award prizes if no qualified entries are received or if the judges make no award.

**Publicity:** NCSLI International may use the names, biographical information, prize amounts and photographs of winners for publicity purposes. NCSLI International may use biographical information from authors of all papers it chooses to publish.

Organizations that disallow prize money may designate their contributions to the NCSLI Education Development Fund when submitting their abstract and project descriptions.
During a recent trip to lecture on calibration intervals in Seoul, we had the opportunity to visit the Korean Association of Standards & Testing Organizations (KASTO) and Korea’s national metrology institute, KRISS (Korea Research Institute of Standards & Science). Roughly speaking, KASTO is NCSLI’s Korean counterpart. The accreditation body KOLAS (Korean Laboratory Accreditation Scheme) is another key part of Korean metrology, the equivalent of NVLAP or A2LA in the U.S.

Korean metrology cuts the leading edge of technology, supporting all facets of commerce from local markets, to health and safety testing laboratories, to leading exporters such as Samsung, Daewoo, Kia, and Hyundai. A quick check of BIPM’s key comparison database turned up 268 KC entries and 924 Calibration and Measurement Capabilities involving KRISS at the time of this writing. Only the US, the UK, Germany, and France have more registered CMCs.

KASTO, created by the Ministry of the Knowledge Economy, maintains training facilities in Seoul with fully equipped classrooms and calibration laboratories. They use a combination of traditional classes, equipment operation demos via video monitors, and practical hands-on training in realistic laboratory environments. The selection of equipment impressed us, covering the gamut of what may be found in physical, dimensional, and electrical metrology labs, including the latest instruments, all calibrated by accredited laboratories. A clean-room environment, complete with an air-shower interlock to remove dust from incoming personnel houses KASTO’s mass calibration area. Encountering a clean room in a training facility was surprising and impressive. The sudden blast of air certainly surprised Ms. Kwon, our unsuspecting translator, who entered first!

The equipment does not go idle. KASTO fills the formal metrology training void for members whose only other resource might be on-the-job orientation. Month in and month out, KASTO trains Korean metrologists, averaging 1,800 per year. Add to that KASTO’s annual seminar, which targets a different metrology topic each time, and you have an effective, high-caliber training program. Considering NCSLI’s growing em-
phasism on metrology education and training, such organizations as KASTO serve as prime examples of what may be accomplished in our field.

Established in 1975 and officially designated Korea’s NMI in 1999, KRISS is currently headed by Dr. M. S. Kim. The beautiful KRISS campus nestles in the hills of the specially developed Daedeog “Science Town” in the city of Daejeon, some two hours south of Seoul by car. We visited only the primary DC electrical area, which maintains a Josephson junction voltage standard, the second such system developed at KRISS without foreign assistance. The institute has a pond, recreational facilities, and many relaxing scenic areas, and also proudly tends a third generation descendant of what is reputed to be Newton’s legendary apple tree on its manicured grounds.

KRISS appears to be ahead of the pack with regard to calibration interval analysis. They have developed interval analysis software called “IntervalOpt” and made it available to Korean metrology organizations. Among other capabilities, IntervalOpt implements the interval test method (A3) and the advanced binomial maximum likelihood estimation method (S2) from NCSLI’s recommended practice RP-1, “Establishment and Adjustment of Calibration Intervals.”

Korea shares at least one challenge with the United States: whole-hearted public adoption of the SI. Make no mistake, the SI is Korea’s official system of units (since 1961) and we noticed no exceptions during our brief visit. Kiosks in the Seoul street markets and high-end department stores alike price weighed goods in Won (W) per 100 g. And naturally, the SI is prevalent at KASTO and KRISS.

However, a conversation with our host indicated that the public has been slow to relinquish traditional Korean measurement units, perhaps more so in the outlying areas than in the main cities. Indeed, much of the literature available in the KRISS lobbies is brochures promoting and marketing the SI to the public, primarily area and mass units. Mass obviously ties to commerce but area (building space and land) ranks high in Korean awareness also. Despite a number of government bans on traditional units, the pyeong (평), about 3.3 m², prevails in the real estate industry, and the geun (근), ranging anywhere from 375 g to 600 g, depending on the commodity, still have common appeal at markets.

This short article doesn’t do justice to the extent and depth of Korean Metrology, but measurement science isn’t the only reason to visit Korea. A trip to the peninsula will uncover an interesting culture with a long history and many amazing places to see and experience that you would not expect beforehand. Everyone we met, both hosts and complete strangers welcomed us graciously. To top it off, our Texas-trained palates found the abundant spicy and hearty Korean food absolutely marvelous.

No doubt about it, Korea measures up as a significant contributor to the world metrology community.

Goodbye for now and go in peace! That’s 안녕히 가세요, (annyeonghi gyeseyo)!

Acknowledgments
We would like to thank the entire KASTO staff, Dr. Gyeong Hee Nam, Mr. Kyu-Won Lee, and Mr. Chan-Bok Park of KRISS, and our translators, Ms. Jae Hyun Cho and Ms. Sena Kwun for making our visit so informative and pleasant.

Photo credits: Cherine Marie-Kuster (cmycolors.com) and KASTO

mjk@ieee.org
Large Volume Metrology Training to Meet Industry Demands to be Launched by NPL

Training framework will make UK the world leader in LVM training.

by Tom Ashby
NPL Training Business Development Manager

On November 3, 2010, the National Physical Laboratory (NPL) will meet calls from global business by launching a large volume metrology (LVM) training program. The service will build on the success of NPL’s dimensional measurement training program, which has led to huge efficiency gains across the UK’s manufacturing industry.

NPL established this LVM training program following a number of calls from big businesses in the UK, Europe and America, such as Airbus and Boeing. Until now, this type of training has been largely developed in-house, with no independently recognized courses available. NPL’s new modules will be the first in the world to fill this gap, providing a framework that can be rolled out internationally to meet the LVM needs of industry.

The courses will apply the training objectives of the existing framework to the equipment and methods used in large volume metrology. LVM presents significantly different challenges due to the scale of the equipment and the environmental issues created by having to measure outside the laboratory. Participants will learn to question, understand and plan the best way to measure, beyond simply being able to use the equipment.

This will help employees build systems to the manufacturing process, reducing errors and waste, and improving quality control and accuracy. This ultimately means businesses can increase productivity and respond to their customers more quickly.

Airbus UK is so convinced of the need for LVM training; they have committed funding to develop the program. Companies including Rolls-Royce and Boeing along with leading academics have helped shape the program.

Amir Kayani, Senior Manufacturing Engineer, Airbus UK, says: “Airbus in the UK is pleased to be supporting the development of a training course for Large Volume Metrology. We recognize the competence of the National Physical Laboratory (NPL) in measurement science, and the need for a course in LVM processes and best practice. We see a course addressing the metrology...
needs for large volume manufacturing and assembly, as being of key relevance to aerospace and other related industries.”

Development has been led by Keith Bevan, Training Product Development Manager at NPL and Stephen Kyle, Honorary Senior Research Fellow at University College London, and a leading name in LVM.

Dr. Kyle comments: “Large Volume Metrology (LVM) is now an integral and indispensable tool in manufacturing construction and assembly. Its proper understanding is critical to its successful application but until now only isolated pockets of knowledge such as text books and equipment manuals were available. NPL’s new training course modules provide structured, guided learning across the field of LVM, for both beginners and advanced users, and helps to fill a major gap in this technology.”

Dr. Brian Bowsher, Managing Director of NPL, added: “Industry looks to NPL, as the UK’s Measurement Institute, to offer the necessary support to ensure it benefits from the best possible measurement expertise. In launching this course we are meeting the needs of the manufacturing industry, and so supporting a vital part of the future economy in the UK and around the world.”

The courses will have significant impact in a range of industries throughout the world, notably aerospace, automotive and defense, but also energy, medical and archaeology. NPL is currently in talks with accreditation body EAL, the UK’s leading awarding body for engineering, technology and related sectors, regarding turning the course into a certified qualification.

The NPL training courses will operate as an extension of its widely respected dimensional measurement training program. Level 1 will be launched on November 3, 2010, at the Large Volume Metrology Conference at Chester Racecourse. NPL will be running pilots throughout the remainder of 2009 with sponsors, and expect to have fully-booked courses by the start of 2010. Level 2 will follow shortly afterwards. More advanced level 3 and 4 training is currently in development.

Those attending the Large Volume Metrology Conference at Chester Racecourse can visit NPL at stand #10, or attend a short presentation at 12:15 to find out more.

**About the National Physical Laboratory (NPL)**

NPL is the UK’s National Measurement Institute and is a world-leading center of excellence in developing and applying the most accurate measurement standards, science and technology available.

Our services range from free technical advice, joint projects, training, secondments, problem solving, consultancy; contract research to highly accurate UKAS accredited measurement services. NPL Training’s Dimensional Measurement Program is made up of 4 Levels and is validated by The National Skills Academy for Manufacturing (NSA-M).
The International Laboratory Accreditation Cooperation (ILAC) Laboratory Committee (LC) met during the joint International Accreditation Forum (IAF)/ILAC Conference October 16 – 17 in Vancouver, British Columbia, Canada.

**EC Regulation 765/2008**

The European Commission implementation of regulation EC 765/2008 is effective Friday, January 1, 2010. This regulation places requirements on accreditation within the European Union and makes accreditation a public authority (government activity).

Specifics as they relate to NCSLI membership are:

- Only one accrediting body is allowed per economy.
- It must be a governmental agency.
- Cross border accreditation is not allowed, i.e., Accrediting bodies cannot do business in countries other than their own within the EU. Multi-national companies that use one accrediting body or certification body globally would need to use the recognized accrediting body within the country their operation is located. If operations are done in multiple European countries, it is believed each country will have a different (local) certification.

Article 7 of the regulation addresses cross frontier accreditation. Discussions are in process as the EC is recognizing the impact on Conformity Assessment Bodies (CAB) that have operations in more than one economy. As the regulation is written, each body will need a certification from the local accrediting body, causing the CABs to receive multiple accreditations to do business in more than one economy. The European cooperation for Accreditation (EA) has recognized this is a burden on the CABs and has asked the EC to review article seven and issue guidance. It is hoped that whatever guidance is issued (if any) will apply equally to CABs and commercial entities.

Article 39 of the regulation addresses the use of existing certificates from Accrediting Bodies (ABs) not is the laboratory’s economy. After December 31, 2013 the certificate must be issued by the local AB, as the previous certificate will no longer be valid. If the certificate expires before December 31, 2013 it also must be renewed within the local economy.

The EA will maintain the ILAC/IAF arrangements; realizing non-EU accrediting bodies may not meet the EC requirements. The EA will maintain the current Mutual Recognition Agreements (MRA) and Multi-Lateral Arrangements (MLA), but these will be revised to incorporate the EC requirements when renewed or as of January 1, 2012.

The EC will require member states to accept certificates from member states within the EU, but they are not required to accept a non-EU (ILAC signatory) certificate. The EU member state has the option to accept a non-EU certificate.

Reasons where a non-EU certificate may not be accepted is when the certificate is utilized in a regulated activity. When accreditation or certification is required in a regulated activity, the certificate should be from an organization that meets the EC requirements for certification. If the certifying body does not meet the new EC requirements, the certificate may not be accepted.

**Merger of IAF and ILAC**

A vote will be held during the November – December timeframe concerning the merger of IAF and ILAC. Considerable discussion was had during the conference and the LC voiced concerns about how this would affect the view of accreditation and the current ILAC arrangements.

There is a concern that regulation within economies that specify the ILAC arrangement as a requirement for trade may have difficulty with changes to the structure of these organizations (IAF and ILAC). The WTO has additionally voiced a concern.
There are three possible outcomes from the vote: 1) leave things as they are; 2) move to closer cooperation; 3) full merger of the organizations. Results of the vote should be known in early 2010.

**ILAC Arrangement Committee**

The Arrangement Committee is working for wider acceptance of the ILAC MRA. The EA is working for wider acceptance within Europe and there is additional interest within North America.

The vote to update ILAC G21: “Cross frontier accreditation principles for avoiding duplication” did not pass. Additional work is being done to investigate if G21 can be revised so it does not conflict with the legal framework of the member economies and be acceptable to the majority of the ILAC members.

**ILAC Accreditation Issues Committee**

Current activities of the Accreditation Issues Committee (AIC) are working on documents for:
- Guidelines for Remote calibration
- Accreditation of NMIs
- A revision of ILAC G2: “Guidelines for the traceability of measurement” is being worked on.
- A document is in process for the assessment of Reference Material Providers. It is hoped to be available for comments before the end of 2009.
- A revision of ILAC G18: Criteria for the formulation of scopes of accreditation for laboratories.
- There is work being done on a guidance document for the implementation of a medical accreditation system.
- A revision of ILAC G19: “Guidelines for forensic laboratories” is being worked on. The EA requested the document be updated to encompass the entire process, from the crime scene to the written report.
- The AIC is in discussions with IAF, ILAC and the International Electrotechnical Commission (IEC), working to gain closer cooperation between the organizations through the use of IEC technical assessors and a common report to decrease the number of assessments some laboratories are required to undergo.

The AIC is also planning a workshop for sampling at the mid-year meeting in April. More information on this is at the end of the article.

**ISO Document Revisions**

ISO 17011 is being reviewed about how or if ISO 17043 applies to ABs that have Proficiency Testing (PT) activities. This issue is not that they perform PT as part of the competency requirements, but if they can demonstrate their impartiality is not compromised.

ISO 17025 is overdue for review and will be evaluated in early 2010. The LC has requested apposition on the working group and it is expected this will be granted.

It is believed there will be a revision to ISO 17025, but it would be a “look and feel” update to bring it in line with the current ISO documentation. Changes to the management section or technical sections may be made, depending on input from the working group.

**ISO CASCO**

The ISO Committee on conformity assessment (CASCO) now has an interpretive panel for standards. These interpretations are not considered requirements, but they are reviewed when the standard is revised for possible inclusion or changes. Requests for interpretations can be submitted through an AB that is an ILAC member.

**Laboratory Committee Requests**

The LC is requesting the following information from their members.

1. We would like to know if companies are seeing differences between the requirements of accrediting bodies. When assessments are performed, are the assessment practices and requirements for accreditation similar? Are there differences that make it difficult for the company to maintain or accredit the labs?
2. Non-conformance information from laboratory assessments that have been challenged is needed. This will be used for assessor training and consultation for the Accrediting Bodies. All laboratory identifiable information will be kept out of the information used for training. Only the submitting laboratory and I will know the source of the information.
3. With the upcoming start date of the new EU regulation (January 1, 2010) if laboratories have difficulty with acceptance of their work or products, they need to raise the issue with their Accrediting Body and also notify me. I’ll raise the issue through the ILAC Laboratory Committee and it will be passed to the EA.

Responses to these questions should be submitted to randy.vanwie@tek.com. They will be forwarded to the Laboratory Committee for review and if needed, discussed as an issue at the next meeting.

randy.vanwie@tek.com
As we are entering a new decade, we also enter a new era for conformity assessment bodies in Europe. This is due to a new European legal framework on accreditation and market surveillance.

by Prof. Horst Czichos, University of Applied Sciences
Contributing Editor

This first Letter from Europe in 2010 deals with: Strategies in the New Decade and Accreditation and Conformity Assessment.

- Accreditation: The new legal EU framework relating to the marketing of products, applying from January 2010.
- Conformity Assessment: The updated EUROLAB Strategy for measurement, testing and analytical services.

A general look at the interrelations between market, trade, conformity assessment, and accreditation

In today’s global market and trade there is an increased need for conformity assessment, calibration, testing, inspection, and certification ensuring that products and equipment meet specifications. Along with the growing use of these conformity assessment tools goes the request for assurance of the competence of the conformity assessment bodies. An increasingly applied and recognized tool for this is accreditation. Figure 1 gives an overview of the interrelations between market, trade, conformity assessment, and accreditation.

To support market and trade, conformity assessment services play an important role. The primary goal of conformity assessment is to provide the user, purchaser or regulator with the necessary confidence that a product, service, process, system or person meets relevant requirements. The International Standards relevant for conformity assessment services are provided by ISO’s Committee on Conformity Assessment (CASCO). The conformity assessment tools are listed in Table 1 with identification (x) on their use by first parties (suppliers), second parties (customers, regulators, trade organizations) and third parties (bodies’ independent from both suppliers and customers).

The EU legal framework relating to the marketing of products

Before considering the new developments, a look back on the evolution of the European Economic Community should be made. Thanks are due to Anita Schmidt from BAM, the German Federal Institute for Materials Research and Testing, for her help in compiling the following overview on the EU legal framework and its new developments relating to the marketing of product.
The establishment of a common European market depends upon an adequate level of technical harmonization. To this aim, EU legislation was revolutionized in 1985 with the so-called “New Approach to harmonization and standardization.” This “New Approach” is based on a few key principles:

- EEC legislative harmonization (e.g. EEC Directives for product groups: toys, construction products, machinery etc.) ensures the free movement of products throughout the Community.
- Corresponding technical specifications are described in harmonized standards.
- Products manufactured in conformity with harmonized standards are presumed to be conformant to the essential requirements.
- CE marking allowing the manufacturer to declare that the product is in conformity with the legislative requirements and may be placed on the market.
- Safety clauses require the Member States to take all appropriate measures to withdraw unsafe products from the market.

2010 The New EU Internal Market Package for Goods

Modernizing the “New Approach,” in 2008 a new legislative framework for marketing of products was adopted, which applies from January 1, 2010. The new measures consist of the following three legal acts:

- Regulation (EC) No. 765/2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products.
- Decision No. 768/2008/EC on a common framework for the marketing of products
Regulation (EC) No. 764/2008 laying down procedures relating to the application of certain national technical rules to products lawfully marketed in another Member State. Of the three acts, Regulation No. 765/2008 on accreditation and market surveillance is the most important for the conformity assessment bodies. In order to enhance the confidence in and quality of conformity assessments of products it contains clear rules on the requirements for notification of conformity assessment bodies. The accreditation system is chosen as a major tool.

Herewith, for the first time a legal framework for the provision of accreditation services across Europe applies. It covers the operation of accreditation in support of both voluntary conformity assessment as well as conformity assessment required by legislation. Important aspects are:
- accreditation as public authority activity
- responsibility of the member state
- one national accreditation body per country permitted
- conformity assessment body must use its national accreditation body
- cross frontier accreditation is generally not possible and restricted to exceptional cases
- the European co-operation for Accreditation (EA) to coordinate European accreditation infrastructure.

In essence, the Regulation will require National Accreditation Bodies:
- to operate on a not for profit basis
- to be objective and impartial
- to employ competent personnel for the tasks to be carried out
- to be independent from the conformity assessment bodies they accredit
- not to offer services offered by conformity assessment bodies.

To improve the consistency of accreditation services across Europe, the Regulation sets common requirements for national accreditation bodies, to be monitored by Member State governments. The Regulation also recognizes the European co-operation for Accreditation (EA) as the coordinating organization for the national European accreditation infrastructure. National accreditation bodies will be required to be members of EA and to participate in the peer evaluation program operated by EA as the preferred means of demonstrating compliance with the legal requirements.

**Developments in conformity assessment: The EUROLAB strategy in 2010**

With the evolution of the European Union, the conformity assessment bodies in Europe gathered together to form EUROLAB as an international forum for the laboratory community.

**EUROLAB’s general objectives are:**
- Representation by formulating and voicing the opinion of laboratories regarding economical, political and technical issues on the European scene, and also worldwide.
- Coordination by interfacing with organizations having activities of interest to the laboratory community.
- Action by providing adequate means for the exchange of information and experience.
- Promotion of cost-effective testing, calibration and measurement services, for which the accuracy and quality assurance requirements are adjusted to actual needs.

<table>
<thead>
<tr>
<th>Tools for Conformity Assessment</th>
<th>First Party: (suppliers, users)</th>
<th>Second Party: (customers, regulators, trade associations)</th>
<th>Third Party: (bodies independent from first and second parties)</th>
<th>ISO Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier’s Declaration</td>
<td>x</td>
<td></td>
<td></td>
<td>ISO/IEC 17050</td>
</tr>
<tr>
<td>Calibration Testing</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>ISO/IEC 17025</td>
</tr>
<tr>
<td>Inspection</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>ISO/IEC 17020</td>
</tr>
<tr>
<td>Certification</td>
<td></td>
<td></td>
<td>x</td>
<td>ISO 17021 ISO Guide 65</td>
</tr>
</tbody>
</table>

Table 1. Tools for Conformity Assessment.
For the future development of EUROLAB major driving forces are:

- the changing market situation requires more attention to be paid to the customer relationships, and development of new or improved services
- the need to improve the technical competence and infrastructure of measurement, testing and analytical services also in order to make the innovation process more effective
- the increased emphasis on sustainable development, environmental issues and improved reliability and safety
- the possibility to create or make use of novel R&D results, especially in the field of life sciences and nanotechnologies
- the integration of new EU member countries
- the internationalization and globalization process forcing EUROLAB to be much more active in the international arena.

As a result of the EUROLAB strategy, the following key goals should be achieved:

- improved cost-effectiveness in the whole value chain of measurement and testing
- more added value from accreditation
- stronger influence on legislation by expressing the views of the laboratory community
- more differentiation in the services provided to national EUROLABs and their members with increased two-way communication
- enhanced information activities, especially in support of technical advice to the laboratory community.

Concluding this overview on developments in accreditation and conformity assessment, a statement on the importance of measurement and testing by the Commission of the European Union will be quoted:

_There is no science without measurements, no quality without testing and no global market without standards._

**SUDOKU**

```
<table>
<thead>
<tr>
<th>5</th>
<th>9</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Answers on Page 48
Advertisers Index

Thank You Advertisers!

2010 NCSLI Workshop & Symposium
www.ncsli.org............... Outside Back Cover

2010 NCSLI Conference Call for Papers
www.ncsli.org............... Inside Front Cover

Custom-Cal
www.custom-cal.com.............. 43

Dynamic Technology
www.dtical.com............... 47

Edison
www.dtical.com............... 46

Fluke
www.fluke.com.................... 24

IAS
www.iasonline.org............... 5

Measurements International
www.mintl.com..................... 21

Mensor
www.mensor.com................... 19

NCSLI Measurement Science Education
and Outreach
www.ncsli.org...................... 15

PPM
www_ppminc.com.................... 25

The Joe D. Simmons Memorial Scholarship
www.simmons-scholarship.com............. 29

Troemner
www.troemner.com.................. 45

Adverting Opportunities
All advertising is reserved exclusively for NCSLI Member Organizations.

NCSLI INTERNATIONAL Measure
The Journal of Measurement Science
Measure provides NCSLI members with practical and up-to-date information, news and articles.

Quarterly news about NCSLI people, events, committees, and laboratories.

For pricing, specifications, publication calendar, and deadlines see www.ncsli.org, or contact Linda Stone, lstone@ncsli.org

303-440-3339

Sudoku Solution

Metrologist : January 2010
when PRECISION MATTERS

NCSL International encourages you to become a member of this renowned organization designed specifically for industries and professionals who interface with Metrology, the study of measurement science.
21ST CENTURY INNOVATIONS IN METROLOGY

Don’t miss this NCSL International Workshop & Symposium

July 25-29, 2010 at the Rhode Island Convention Center, Providence, Rhode Island

For more information please visit us at www.ncsli.org or call us at 303.440.3339