

2016 NCSLI WORKSHOP & SYMPOSIUM

# MEASUREMENT ACCURACY

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# IMPACT on society



**NCSL INTERNATIONAL**  
Serving the World of Measurement

**July 24–28, 2016**

Tutorial Program July 24–25

Exhibition Hall July 25–28

Technical Program July 26–28

**Saint Paul RiverCentre | Saint Paul, Minnesota**

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# InterContinental Saint Paul Riverfront

**HQ Hotel — \$169  
Government Rate \$140**

**11 Kellogg Boulevard East  
Saint Paul, Minnesota 55101  
651-292-1900**

## FULL CONFERENCE REGISTRATION RATES MONDAY, JULY 25 – THURSDAY, JULY 28

	Regular Rate Ends May 31	Late Rate Begins June 1
Member Rate	\$995	\$1,145
Non-Member Rate	\$1,295	\$1,445
One Day Registration	\$395	\$395
Extra Luncheon Ticket	\$50	\$50

## TUTORIAL PROGRAM REGISTRATION RATES SUNDAY, JULY 24 & MONDAY, JULY 25

	Regular Rate Ends May 31	Late Rate Begins June 1
1/2 Day Registration: Member/Non-Member	\$275 / \$375	\$300 / \$400
1 Day Registration: Member/Non-Member	\$450 / \$550	\$475 / \$575
2 Day Class Registration: Member/Non-Member	\$700 / \$800	\$750 / \$850

## EXHIBITORS

AccuMac Corporation	Data Proof	Mensor Corporation	Precision Environments Inc.
Acucal, Inc.	Essco Calibration Laboratory	Mettler Toledo, Inc.	Quality Magazine
ACR Technical Services, Inc.	Exelon PowerLabs	Meatest spol. s r.o	Radian Research, Inc.
A.K.O. Inc., Torque Specialties Div.	FasTest, Inc.	Measurement Science Conference	Ralston Instruments
Additel Corporation	Flexim Americas Corporation	Michell Instruments, Inc.	RH Systems
Alpha Electronics	Fluke Calibration	Mitutoyo America Corp.	Rice Lake Weighing System
American Assoc. for Lab. Accreditation	Fowler Precision Tools	Morehouse Instrument Company	Sartorius Corporation
Ametek Test & Calibration Instruments	Fox Valley Metrology	National Research Council of Canada	SIKA USA
Ametek Land, Inc.	GE Measurement & Control Solutions	National Association for Proficiency Testing	Spektra Calibration Systems
Andeen-Hagerling, Inc.	Guildline Instruments Limited	National Physical Laboratory (NPL)	Tegam, Inc.
ANSI-ASQ National Accreditation Board (ANAB)	Interface, Inc.	NCSL International	The Boeing Company
AOIP	International Accreditation Service (IAS)	NCSL International Learning & Development	The Modal Shop, Inc.
ASQ-MQD	Isotech North America	NIST Calibration Services	Thunder Scientific Corporation
AssetSmart	Keysight Technologies	Northrop Grumman	Tovey Engineering, Inc.
Bionetics Corp.	King Nutronics Corporation	Norway Labs	Transcat
Burns Engineering, Inc.	Liberty Labs, Inc.	NVLAP	Transmille Calibration
Bruel & Kjaer, North America, Inc.	Lockheed Martin Mission Systems and Training	OHM-Labs, Inc.	Trescal, Inc.
Conference on Precision Electromagnetic (CPEM)	Lockheed Martin IS&GS Defense	On Time Support, Inc.	Vaisala, Inc.
Cal Lab Solutions, Inc.	Mahr Federal, Inc.	Pond Engineering Labs, Inc.	Vibration Research Corporation
Colorado Engineering Experiment Station Inc.	Martin Calibration	Pratt & Whitney Measurement Systems	Western Environmental Corporation
	Masy BioServices		WorkPlace Training
	Measurements International		



## Ralph M. Paroli, Opening Keynote Speaker

### Developing Quality Standards for Cannabis using the ASTM Approach

As more countries and states legalize the use of cannabis (for medical or recreational purposes), the need for normative and calibration standards becomes increasingly critical. For example, how do enforcement agencies know that the cannabis is natural or synthetic, how will they know how much THC is in the blood stream, how will labelling be used to properly indicate THC content, how will the packaging be made child-proof (i.e., foods which contain THC), etc. Normative and calibration standards will be necessary to help address these issues. Normative standards help establish quality and test protocols while calibration standards help to ensure that a quality result is obtained.

ASTM International is a global leader in the development and delivery of voluntary consensus standards. There are over 12,000 standards developed by ASTM which are used worldwide to improve product quality and enhance health and safety. These standards are what help to bolster consumer confidence. ASTM International is recognized as a standards developing organization (SDO) in the US and Canada. With the help of an advanced IT infrastructure, standards are developed using contributions from international technical experts representing 140 countries. Members create the test methods, specifications, classifications, guides and practices that support industries and governments worldwide. Using this infrastructure and expertise will allow the regulatory community to have standards developed in an efficient timeline. ASTM International's efficiency will help regulate the medical cannabis quality, differentiate between the various concentrations, and ensure that globally-accepted analytical techniques are available.

Dr. Ralph M. Paroli, C.Chem., is responsible for providing leadership and managing research activities. Since 2013, Paroli has served as R&D Director in Measurement Science and Standards at NRC. Prior to that, from 1998 to 2012, he served as director of Building Envelope and Structure, Institute for Research in Construction, where he had responsibility for the NRC research program addressing concrete materials durability and repair, wall and window systems performance, and thermal and moisture performance of materials and roofing systems. Paroli is the ASTM International 2016 Chairman of the Board. An ASTM International member since 1994, he has served on its board since 2011. He was the Chairman of Committee D08, and a member of D11 on Rubber and E60 on Sustainability. He has also served a term on the ASTM Committee on Standards which reviews and approves all technical recommendations for actions on standards. Dr. Paroli is a member of the American Chemical Society, Chemical Institute of Canada, Association of Professional Chemists of Ontario, and the Society for Applied Spectroscopy.



## Jeremy Applen, Closing Keynote Speaker

### Cannabis: The State of the Science

With the US cannabis market valued at \$2.7 billion in 2014, the burgeoning cannabis industry is driving advancements across areas such as botanical medicine, medical devices, separations and analytical chemistry, manufacturing and quality management. This session will share examples of innovation while discussing opportunities and the need for interdisciplinary collaboration between industry, scientists and engineers. Attendees will gain an improved understanding of the complexities and opportunities in this rapidly growing industry.

Jeremy Applen entered the cannabis arena with a background in pharmaceutical research and development, including experience gained at Pfizer and the Department of Veterans Affairs Cooperative Studies Program Clinical Pharmacy Coordinating Center. Founding Page Analytical, New Mexico's first state-approved Medical Cannabis Testing Facility, Jeremy worked with the New Mexico Department of Health, Medical Cannabis Program, in drafting regulatory guidelines and improving alignment with regulations utilized by the US Food and Drug Administration for analogous products. Since that time, he has worked closely with government regulators and numerous cannabis organizations both nationally and internationally, to resolve significant issues related to regulations, product quality and product safety. Jeremy is an ISO 17025:2005 assessor for the American Association of Laboratory Accreditation and has spoken throughout the US on topics such as the practical and technical issues faced by cannabis laboratories.



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## TUTORIAL PROGRAM | July 24 – 25

### SUNDAY, JULY 24

**T1 - An Introduction to Instrument Control and Calibration Automation in LabVIEW™**  
*Logan Kunitz, National Instruments*

**T2 - Traceability, Operations, and Good Measurement Practices for Balances in an Analytical Environment**  
*Mark Ruefenacht, Heusser Neweigh and Val Miller, NIST*

**T3 - Understanding ISO/IEC 17025 Requirements**  
*Pam Wright, A2LA*

**T4 - Pressure Metrology**  
*Mike Bair, Fluke Calibration*

**T6 - Control Charts and Stability Analysis for Calibration Laboratory Reference Standards**  
*Jeff Gust, Fluke Calibration*

**T7 - Geometric Dimensioning & Tolerancing (GD&T) Basics Workshop**  
*E.A. "Tony" Bryce, Sandia National Laboratories*

**T8 - Fundamentals of Gas Flow Measurement**  
*Robert DeRemer, CSA Group*

**T9 - The Art of Resistance: Metrology from Micro-Ohms to Tera-Ohms**  
*Kai Wendler, NRC Canada and Marlin Kraft, NIST*

**T10 - Force Calibration**  
*Henry Zumbrun, Morehouse Instruments, Inc.*

**T11 - Analytical Forensic Metrology**  
*Jerry Messman, Stranaska Scientific*

**T12 - Dynamic Sensors & Calibration**  
*Eric Seller, The Modal Shop*

**T27 - Introduction to Automated Calibration using Microsoft® VB.NET®, C# and Metrology.NET™**  
*Michael Schwartz, Cal Lab Solutions*

### MONDAY, JULY 25

**T13 - So – You think you know DC Resistance and Current Measurements**  
*Mark Evans, Guildline Instruments*

**T14 - Application of Calibration Data in a Testing Lab**  
*Gabrielle Ahrens, AASHTO Materials Reference Laboratory*

**T15 - Applying LEAN in a Calibration Laboratory Environment**  
*Dean Williams, Duke Energy and Tom Knight, Invistics Corporation*

**T16 - Auditing, Traceability, and Auditing Traceability**  
*Kari Harper, NVLAP and Isabelle Amen, NRC Canada*

**T17 - Intermediate Dimensional Metrology**  
*Ted Doiron, NIST*

**T18 - Effective Calibration Interval Analysis**  
*Mark Kuster, Pantex Metrology*

**T19 - Test Uncertainty**  
*Jim Salisbury PhD, Mitutoyo America Corporation*

**T20 - Fundamentals of Torque Calibration**  
*Henry Zumbrun, Morehouse Instruments, Inc.*

**T21 - Fundamentals of Temperature Calibration**  
*Mike Coleman, Fluke Calibration*

**T22 - Humidity Calibration Tutorial**  
*Jeff Bennowitz, Mike Hamilton, Thunder Scientific Corporation*

**T23 - Microwave Measurement Basics**  
*Ron Ginley, NIST*

**T24 - Advanced Topics of Temperature Calibration**  
*Mike Coleman, Fluke Calibration*

**T25 - Microwave Power Sensor Calibration**  
*Andy Brush, TEGAM, Inc.*

**T26 - Fundamentals of Radiation Thermometry Calibration**  
*Frank Liebmann, Fluke Calibration*

## Hands-on Training by Industry Experts

### Benefits of Hands-on Training

Even with the many advances in the training industry, traditional formats remain viable and effective. Classroom or Instructor-led training remains one of the most popular training techniques. It is a personal, face-to-face type of training as opposed to computer-based training and other methods.

Training programs are more beneficial when they provide many opportunities for practicing a skill. Hands-on training means you get to use your hands to perform tasks. This training aims to make conditions as realistic as possible. The biggest benefit of hands-on training is the opportunity for repeated practice.

# TECHNICAL PROGRAM | July 26 – 28

## TUESDAY, JULY 26 SESSION 1

Amazing Stories  
OF Measurement

### 1A Amazing Stories of Measurement I

Measurement Science for Metals-Based Additive Manufacturing

Kevin Jurrens, National Institute of Standards and Technology (NIST)

### 1B Dimensional Metrology I

Some Significant Errors in ULMs That You Don't Know About

Dr. Ted Doiron, National Institute of Standards and Technology (NIST)

On the Feasibility of Performing Line Scale Measurement on a High Accuracy Coordinate Measuring Machine

Wei Ren, National Institute of Standards and Technology (NIST)

### 1D Panel Discussion: Healthcare Metrology

New NCSLI RP-6 Calibration Quality Systems for the Healthcare Industries

Panelists: Walter Nowocin, Medtronic PLC; Joe Petersen, Abbott Laboratories; Howard Zion, Transcat, Inc; Finn Christensen, Novo Nordisk

## SESSION 2

Amazing Stories  
OF Measurement

### 2A Amazing Stories of Measurement II

Avoiding One Click Meltdown: Electronic Health Record Safety Related Usability Standards

Dr. Lana Lowry, National Institute of Standards and Technology (NIST)

### 2C Electrical – Resistance

Design, Construction and Calibration of a Temperature Monitoring System for Resistance Standards

Daniel Paseltiner, National Institute of Standards and Technology (NIST)

A Cryogen-free Table-top Primary Resistance Standard

Dr. Jan-Theodoor Janssen, National Physical Laboratory (NPL)

### 2D Panel Discussion: The Next Generation

Development of Early Career Professionals: Military and Industry

Panelists: Matt Aloisio, Radian Research, Inc.; Travis Gossman, Rockwell Collins; Leah Lindstrom, The Boeing Company; Cody Luke, The Boeing Company

## SESSION 3

### 3A Metrology Education

Three Decades of Metrology Education in Mexico

Roberto Benitez, ETALONS

Integrating a CMM into an Engineering Technology Class Utilizing Simulation and Hardware

Joseph Fuehne PhD, Purdue Polytechnic Columbus

Metrology Education at UNC Charlotte

Chris Evans PhD, UNC Charlotte

### 3B Mass/Force I

The NIST Magnetic Suspension Mass Comparator

Corey Stambaugh PhD, National Institute of Standards and Technology (NIST)

Measuring Mass in Vacuum Using Surface Artifacts

Patrick Abbott, National Institute of Standards and Technology (NIST)

The Design and Construction of the In-Vacuum Mass Exchange System for the Realization and Dissemination of the New SI Unit of Mass

Leon Chao, National Institute of Standards and Technology (NIST)

### 3C Temperature I

The Impact of Pressure and Temperature upon the Modern Football

Kevin Radzik, Alliance Calibration

Best Practices for Properly Using Thermometric Fixed-Point Cells as Calibration Reference Standards

Michael Coleman, Fluke Calibration

Qualifying a Check Standard for Infrared Thermometry Calibrators

Frank Liebmann, Fluke Calibration

### 3D Quality control

Remote Auditing: Love It or Hate It – Let's Embrace It!

Guy Robinson, Tektronix, Inc

Instrument Models: Application and Benefits

Mark Kuster, Pantex Metrology

Creating a Standardized Schema for Representing ISO/IEC 17025 Scope of Accreditations in XML Data

David Zajac, Cal Lab Solutions, Inc.

## WEDNESDAY, JULY 27 SESSION 4

### 4A Amazing Stories of Measurement III

The Linchpin in Medical Physics: Ionizing Radiation Measurements for Health Care

Lisa Karam, National Institute of Standards and Technology (NIST)

In Vivo Map-Making with Magnetic Resonance: Standards for Quantitative Imaging

Michael Boss, National Institute of Standards and Technology (NIST)

### 4B Pressure I

Analysis of Pressure Measurement Techniques from 1 kPa to 130 kPa

Jacob Ricker, National Institute of Standards and Technology (NIST)

Photonic Realization of the Pascal

Dr. Jay Hendricks, National Institute of Standards and Technology (NIST)

Recent Improvements in the Leak Comparison Service at the National Institute of Standards and Technology

Greg Scaze, National Institute of Standards and Technology (NIST)

### 4C Temperature II

A Review of In-situ Temperature Measurements for Additive Manufacturing Technologies

Ryan Murphy, Sandia National Laboratories

Transporting Frozen Vaccines Safely: Methods for Temperature Monitoring and Control

Michal Chojnacky PhD, National Institute of Standards and Technology (NIST)

Modeling Insulation Leakage Effects on Platinum Resistance Thermometer Performance

Michael Coleman, Fluke Calibration

## SESSION 5

### 5A Amazing Stories of Measurement IV

Towards X-ray Vision: Compton Gamma Imaging at the NRCC

Patrick Saull, National Research Council Canada (NRC)

### 5B Pressure II

Use of Modern Leak Detectors for the Calibration of Leak Standards

Eric Forrest PhD, Sandia National Laboratories

Optimizing the Performance of the Compare II Leak Calibration System

Timothy Moss, Sandia National Laboratories

### 5C Electrical – AC

Influence of Adapters on AC-DC Difference Measurements

Dr. Stefan Cular, National Institute of Standards and Technology (NIST)

Multijunction Thermal Converters for AC Current Metrology

Thomas Lipe, National Institute of Standards and Technology (NIST)

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# TECHNICAL PROGRAM | July 26 – 28

## 5D Proficiency Testing

**Proficiency Testing: What to Do When Commercial Testing Is Not Available**

*Jennifer Fleenor, Tektronix*

**Summary of Electronic Balance Calibration Proficiency Testing in Taiwan**  
*Yi-Ting Chen, Center for Measurement Standards/Industrial Technology Research Institute*

## SESSION 6

### 6A Strategic & Economic Evaluations at NMIs

**The Method of the Quantitative Assessment of the Economic Feasibility of Creating the Primary (reference) Measurement Standard**

*Dr. Pavel Neyezhnikov, National Scientific Center "Institute of Metrology"*

**Reflections on Strategy, Sustainability and Value Creation in NMIs**

*Dr. Salvador Echeverría-Villagómez, Centro Nacional de Metrología (CENAM)*

### 6B Dimensional Metrology I

**Utilizing Measurement Tools to Develop a Shrink Rule for the 3-D Printing Process**

*Joseph Fuehne PhD, Purdue Polytechnic Columbus*

**Dimensional Fidelity of Replica Casting Compound**

*Ed O'Brien, Sandia National Laboratories*

### 6C Uncertainty Concepts

**Characterization of Measurement Uncertainty and Figures of Merit for Biotoxin Quantification**

*Dr. Tobias Karakach, National Research Council of Canada (NRC)*

**Comparative Calculations to Evaluate Proposed Changes to the GUM**

*Russell Geisthardt, Keysight Technologies*

### 6D Healthcare Metrology

**Calibration in Regulated Industries: Federal Agency Use of ISO/IEC 17025 and ANSI/NCSL Z540.3**

*Paul Reese, Baxter Healthcare Corporation*

**Volumetric Accuracy of Pipettes in the Life Sciences Laboratory**

*George Rodrigues, Artel*

## SESSION 7

### 7A New Challenges/Developments

**Advanced Measurement Dissemination for Thermodynamic Quantities**

*Gregory Strouse, National Institute of Standards and Technology (NIST)*

**Metrology of Navy Directed Energy Weapons**

*Dr. Subrata Sanyal, Naval Surface Warfare Center (NSWC), Corona Division*

**Issues and Strategies for Improving Measurement Uncertainties for Solid-State Lighting**

*Joanne C. Zwinkels PhD, National Research Council of Canada (NRC)*

### 7B Mass/Force II

**System for Traceable Calibration of Nanonewton Forces and Force vs. Deformation Curves**

*Dr. Michael Kühnel, Technische Universität Ilmenau*

**Design of a Table-top Watt Balance**

*Stephan Schlamminger PhD, National Institute for Standards and Technology (NIST)*

**Design of Digital Controllers for Electromagnetic Force Compensated Balances Focused on the Disturbance Transfer Function**

*Norbert Rogge, Technische Universität Ilmenau*

### 7C Metrology Potpourri

**Characterization of the NIST Magnetic Suspension Mass Comparator Apparatus and Facility**

*Edward Mulhern, National Institute of Standards and Technology (NIST)*

**Extension of Calibration Capabilities for the NIST Hybrid Humidity Generator**

*Christopher Meyer, National Institute of Standards and Technology (NIST)*

**Extending Oscilloscope Bandwidth Calibrations to 27GHz**

*Paul Roberts, Fluke Calibration*

## 7D Panel Discussion: ISO/IEC 17025

**Panel Discussion: Update on the Revision of ISO/IEC 17025**

*Panelists: Jeff Gust, Fluke Calibration; Tim Osborne, Trescal Corporation; Trevor Thompson, United Kingdom Accreditation Service; Georgette Macdonald, National Research Council Canada; Steve Sidney, National Laboratory Association - South Africa*

## THURSDAY, JULY 28

## SESSION 8

### 8A Amazing Stories of Measurement V

**Transforming Welding with Comprehensive Metrology**

*Dr. Marla Dowell, National Institute of Standards and Technology (NIST)*

### 8C Microwave

**Traceability of Vector Network Analyzer Calibration Kits**

*Eric Smith, Keysight Technologies*

**Modeling the Effect of Noise Source Mismatch on Y-Factor Noise Figure Measurement Uncertainty**

*Ken Wong, Keysight Technologies*

### 8D Conformance Testing

**Conformance Decision Rules to Support ISO/IEC CD 17025 Under Revision**

*Robert Stern, Keysight Technologies*

**Understanding the Test Measurand and the Profound Impact on Calibration, Verification, and Uncertainty**

*Jim Salisbury PhD, Mitutoyo America Corporation*

## SESSION 9

### 9A Global Standards/Traceability

**Promulgation of New and Improved Measurement Knowledge Through Standards Development**

*Andy Oldershaw, National Research Council Canada (NRC)*

**The Laboratory Committee of the International Laboratory Accreditation Cooperation**

*Steve Sidney, National Laboratory Association - South Africa*

**Worldwide Measurement Traceability Challenges from an OEM Support Point of View**

*Jorge Martins, National Instruments Corporation*

### 9C Electrical III

**Zener Reference Standards: Myth vs Reality**

*Jeff Gust, Chief Metrologist, Fluke Calibration*

**The Metrology Behind Wideband/RF Improvements to the Fluke Calibration 5790B**

*Milen Todorakev, Metrologist, Fluke Calibration*

**Calibration of Optical Fiber Time Domain Reflectometers in Accordance with IEC 61749-1:2009**

*Samuel Ko, Electronics Engineer, Standards and Calibration Laboratory*

### 9D Healthcare II

**Best Lessons Learned from FDA Calibration-related Warning Letters**

*Walter Nowocin, Medtronic*

**Calibration of Electro-Cardio Graph Simulators**

*Dr. Steven Yang, Electronics Engineer, Standards and Calibration Laboratory*

**Measurement Uncertainties in the Calibration of Climatic (Humidity) Chambers**

*Cesar (Jun) D. Bautista, Jr., PhD, Masy BioServices Inc.*

Amazing Stories  
OF Measurement

# POSTER SESSION I | Tuesday, July 26 | 12:15 PM – 1:00 PM

## Implementation of the New Defense Standard VG96910 Documentation of Calibration Services

Gerhard P. Mihm – Germand Armed Forces Calibration Organization

## Pressure Transducer Sensor Design and Application

Nghiem Nguyen, PhD – Raytheon Space and Airborne System

## Up to 50 GHz Microwave Frequency Measurement Using Down-Convert Technique at Telecommunication Laboratories, Taiwan

Chia-Shu Liao – Chief Researcher, CHT Telecommunication Laboratories

## Calibration of Digital Sensors – a New Challenge for Calibration Laboratories

Michael Mende – SPEKTRA Schwingungstechnik und Akustik GmbH

## Uncertainty Evaluation of Profile Projector Calibration

Yi-Ting Chen – Quality Assurance Engineer, Center for Measurement Standards/Industrial Technology Research Institute

## Diffraction Methods Used in Dimensional Applications

Oelof Kruger – National Metrology Institute of South Africa

## Investigating the Characteristics of Measurement Tools during the Break-In Period

Joseph Fuehne PhD – Purdue Polytechnic Columbus

## Economic Utilization Cost Model

Phillip T. Chase – Chairman

## Computer Aided Calibration of Voltage and Current Surge Generator in Accordance with IEC 61000-4-5:2014

Samuel Ko – Electronics Engineer, Standards and Calibration Laboratory

## Application of High-Power RF Flow Calorimetry to Power and Voltage Calibration

Andrew S. Brush – TEGAM, Inc.

## The Influence of Measurement Uncertainty in Conformity Assessment

I-jhen Lin – Accreditation Officer Taiwan Accreditation Foundation (TAF)

## Development of Educational Prototypes of the SI Base Units

Julio Diaz – Profesor Investigador de Tiempo Completo Universidad Politecnica de Santa Rosa Jáuregui

## Reference Value for Budgeting by Bayes Estimates

Ding Huang – Mathematical Statistician US Department of the NAVY

## Effect of Humidity on Low Voltage Power Supplies

Dr. Cesar (Jun) Bautista – Masy BioServices Inc.

## Building a World-Class Metrology Lab in 182 Days

John Masiello – Masy BioServices

## Uncertainty Score Card with Economic Estimations

Dr. Salvador Echeverría-Villagómez, Centro Nacional de Metrología (CENAM)

## Calculation of the Total Length Uncertainty of a Polymer Part at Non-Standard Temperature

Ali Mohammadi – Technical University of Denmark

## Navy Efforts in Directed Energy Weapons: Importance of Metrology and Calibration

Dr. Subrata Sanyal – Naval Surface Warfare Center (NSWC), Corona Division

## Award Presentations

### Wildhack Award

### Education and Training Award

## Best Paper Awards

### Editor's Choice Award

### Scholarship Awards

## Sponsor Track

### Amazing Stories of Measurement



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# POSTER SESSION II | Wednesday, July 27 | 12:15 PM – 1:00 PM

**The Global Position System Environmental Stress Screening Test**  
*Nghiem Nguyen, PhD – Raytheon Space and Airborne System*

**The Top 5 Challenges Calibration Laboratories Are Facing During Accreditation Process**  
*George Anastasopoulos – International Accreditation Service (IAS)*

**Assessing Your Laboratories Technical Competence in Regards to the Requirements of ISO/IEC 17025:2005, Section 5**  
*Michael j. Kramer – Perry Johnson Laboratory Accreditation, Inc.*

**Calibration of Infrasound Measurement Devices**  
*Michael Mende – SPEKTRA Schwingungstechnik und Akustik GmbH*

**A Novel Approach in Using Proficiency Testing Data to Validate CMM Software for the Regulated Industry**  
*Anish Shah – Chief Metrology Officer, Metrologized, LLC*

**The Impact of BIPM Amendments in the Romanian Mass Dissemination**  
*Dr. Adriana Vălcu – National Institute of Metrology*

**Development of a Virtual Metrology Laboratory with Adaptable Modules**  
*Julio Díaz – Profesor Investigador de Tiempo Completo Universidad Politécnica de Santa Rosa Jáuregui*

**Combined Instruments for Test Efficiency**  
*Tim Coonan – Software Engineer, National Instruments Corporation*

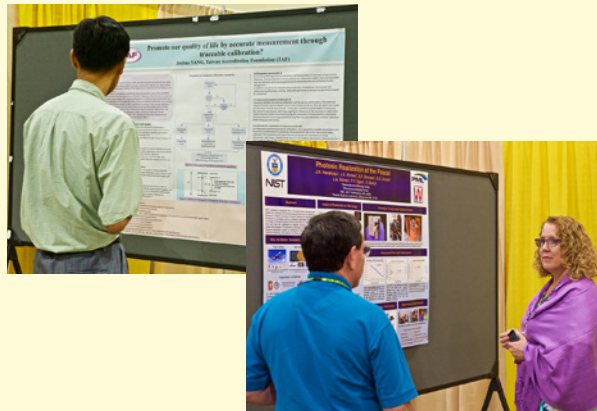
**Millimeter-size Monolayer Epitaxial Graphene for Next Generation Resistance Standards and Future Electronic Applications**  
*Dr. Yanfei Yang – National Institute of Standards and Technology (NIST)*

**Expand Capacitor and Inductor Frequency Range Using a Dependent Correction**  
*Dimaries Nieves – Senior Metrology Engineer, National Instruments Corporation*

**Introduction to the Status of Interlaboratory Comparison on Reference Photovoltaic Cell Calibration at Center for Measurement Standards in Taiwan**  
*Min An Tsai – Center for Measurement Standards/Industrial Technology Research Institute (CMS/ITRI)*

**Accelerometer Calibration Verification with TEDS Capability**  
*Andy Cogbill – Application Engineer, Vibration Research*

**Calibration Due Dates – Daily or End of the Month?**  
*Harry C. Spinks – Business Consultant, TechTrolgy LLC*



**Exhibitor  
Welcome Reception  
Monday  
6:00 PM - 8:00 PM**

**Exhibit Hall  
Open to Public  
Thursday  
10:00 AM - 1:00 PM**

**Keynote  
Breakfast  
Luncheon Buffet  
Networking  
Committee  
Meetings**

**Metrology Mixers  
Tuesday  
4:00 PM - 5:30 PM  
Wednesday  
4:00 PM - 5:30 PM  
Ice Cream Social**

