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NCSLI MEETING ANNOUNCEMENTS

Albuquerque Section

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NCSLI Albuquerque Section

3RD SEMINAR ON SURFACE METROLOGY FOR THE AMERICAS

MONDAY, MAY 12 AND TUESDAY, MAY 13, 2014

$425 Regular Rate / $200 Student Rate

We are proud to announce the 3rd Seminar on Surface Metrology for the Americas, a NCSLI Regional Training Event, held at the Marriott in Albuquerque, New Mexico. It will be a great learning and networking opportunity with two days of tutorials, and followed by the ASME B46 committee meeting.

Register Here

NCSLI Coordinator and Meeting Contact:
Dr. Hy D. Tran
hdtran@sandia.gov
505-844-5417

Meeting Time:
Monday, May 12 and Tuesday, May 13
8:00 am - 5:00 pm

ASME B46 Committee Meetings:
Tuesday, May 13 and Wednesday, May 14
From 5:00 pm Tuesday; reconvene on Wednesday from 8:00 am-12:00 pm

Meeting Location:
Albuquerque Marriott Hotel
2101 Louisiana Blvd. NE
Albuquerque, NM
505-881-6800
Rate: $109
Group code: NCSLI/ASME
Group rate not guaranteed after April 11, 2014

Exhibitors:
FRT of America, LLC
Alicona Corporation
Keyence Corporation
Digital Surf

Meeting Overview:
The purpose of the Seminar on Surface Metrology is to improve the practice of surface metrology through education. Attendees will have the opportunity to attend 8 tutorials of 90 minutes each, and receive certificates of attendance for professional development, from leading experts in surface metrology. Surface texture and properties affect not only engineering, manufacturing, and design, but also find applications in diverse fields such as anthropology or forensics.

NCSLI Albuquerque Training Event Agenda

Download

Meeting Speakers

Dr. Christopher Brown, Worcester Polytechnic Institute (WPI)
Before coming to WPI 25 years ago and founding WPI's Surface Metrology Lab, Chris was at Atlas Copco's research center and the Swiss Federal Institute of Technology. Brown has published over a hundred articles on design, surfaces, and surface metrology. He currently serves at the chair of the ASME B46 committee on surface texture. He and his students have developed several types of multi-scale analyses for characterizing surface topographies and have found strong correlations with their parameters and adhesion, friction, fracture, and fatigue, using multi-scale analyses.

Xavier Colonna de Lega, Zygo Corporation
Mr. Colonna de Lega is a Senior Research Scientist, with Zygo Corporation since 1998. His activities in the field of optical metrology include interferometric and non-interferometric techniques applied to surface and thin film characterization, form and deformation measurements. He is a contributor to more than 40 US Patents and 45 journal or conference papers.

Claudiu Giusca, National Physical Laboratory (NPL)
Mr. Giusca is a senior research scientist in the Engineering Measurement Division at the National Physical Laboratory (NPL) in the UK. He has many publications in surface topography measurement and nanometrology, and is active in the development of standards for surface metrology.

Dr. Matt Novak, Bruker-Nano, Stylus and Optical Metrology
Dr. Matt Novak earned his PhD in Optical Science from the University of Arizona in Tucson, AZ, working in a private capital equipment manufacturer in vibration insensitive interferometric metrology. With nearly 15 years' experience he joined Bruker-Nano in early 2011 as metrology applications manager. Most recently, Matt has been promoted to Director of Technology and Applications in the Bruker-Nano, Stylus and Optical Metrology business.

Eric Oberg, Mitutoyo America Corporation
Mr. Oberg has worked for Mitutoyo America Corporation in Sales for the past 16 years. Previously he headed up Gates Rubber Company's Research and Development Department of Metrology for semi ridged materials.

Dr. Suresh Ramasamy, Hutchinson Technology
Dr. Ramasamy is a Principal Engineer in advanced vision and measurement development at Hutchinson Technology Inc. His experience includes design, qualification, and implementation of 2D, 2.5D, and 3D measurement systems, and multi-scale data fusion for surface metrology. Dr. Ramasamy serves on the project team for optical methods (WG 16) under ISO TC/213 (dimensional and geometrical product specifications), and on the ASME B46 committee on surface texture.

Mike Schmidt, Zygo Corporation
Mr. Schmidt is the Market Development Manager for Zygo Corporation, concentrating on the development of application solutions within the Automotive and Precision Machining markets. With almost 15 years at the Zygo Corporation, he has worked and lived in the US, Germany, and Taiwan, developing customer-based solutions for process control and production floor metrology needs.

Dr. Deepak Sharma, Bruker-Nano
Dr. Deepak Sharma received his PhD in Biochemistry from the University of Dundee (UK). Since 2004, he held a variety of application and product marketing-focused positions for Roper Industries imaging companies. In 2012, Dr. Sharma joined Bruker's Nano Surfaces Division in Tucson, Arizona, as Senior Product Marketing Manager, where he is heading up marketing for several 3D optical microscope product lines.

Dr. Hy Tran, Sandia National Laboratories
Dr. Tran is project lead for length, mass, and force metrology at Sandia's Primary Physical Standards department. He has worked in manufacturing, design, and research and development, all with a focus on precision measurements. He currently serves NCSLI as co-chair for the dimensional metrology committee, and is active with ASME and ISO on standards for surface metrology.

Dr. Ted Vorburger, National Institute of Standards and Technology, (NIST)
Dr. Vorburger is a guest researcher at NIST, where he is active in development of standards for surface metrology. He was group leader in the NIST Surface and Microform Metrology group, and is the former chair of the ASME B46 committee on surface texture.

MONDAY TUTORIALS
MAY 12, 2014
Session R (Measurements)

Fundamentals of Surface Metrology and Texture
Dr. Ted Vorburger, National Institute of Standards and Technology (NIST)
Abstract: When specifying geometry of products, the surface of the product also plays a role in product performance. Texture includes both short spatial wavelength components (what one would call roughness) and longer wavelength components (what one would call waviness and form). Texture may have directionality (lay). These qualities are specified in mechanical product drawings, and the evaluation of roughness is defined in both ASME and ISO standards. This tutorial provides an introduction to surface metrology and to the evaluation of roughness.
Learning Objectives: The attendee will come away with an understanding of the fundamentals of surface metrology, including vocabulary, definitions, and symbols in drawings and an understanding of the importance of texture for engineering performance.
Why attend this tutorial? Engineers, technicians, or managers not familiar with surface roughness, surface topography, or surface metrology will want to attend this tutorial, to develop an understanding of requirements for surface metrology. After this presentation, they will have an understanding of how surfaces are generated and how they are measured.

Comparisons of Methods for Measuring Surface Topography

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

Abstract: There is a wide range of commercial methods available for measuring surface topography. But here is a crucial question: When two different methods are used to measure the same surface, do they get the same result? We will compare a number of profiling and areal methods for measuring surface topography and discuss their strengths and limitations. We will also discuss several experiments that have been performed to compare the results from different methods.

Learning Objectives: The student will come away with a comprehensive overview of the range of optical methods that are commercially available for measuring surface topography, an understanding of the resolution limits and the relative strengths and weaknesses of contacting vs. optical methods, an understanding, based on examples, of the differences that can be observed between various methods.

Why attend this tutorial? Engineers and technicians who use pprox.al instruments for practical measurement of surface roughness and other topography parameters would benefit from this tutorial. They will return to their organizations with renewed insight into the sources of errors in surface topography measurement.

Practical Use of Skidded and Skidless Profilometers

Mr. Eric Oberg, Mitutoyo America Corporation

Abstract: This is a hands-on course utilizing skidded and skidless profilometers. Students will measure various parts utilizing the two systems, to understand their benefits and limitation.

Learning Objectives: Understand the benefit and limitations of a skidded profilometer, have a working knowledge of surface finish parameters, apply a set of surface finish parameters to an application.
Attendees should attend this class that wish to have a hands-on interaction with both Skidded, and Skidless measurement systems. Several different surface types will be available for the students to see the how adjusting parameters will effect measurement outcomes.

Why attend this tutorial? Students should attend this class that wish to have a hands on interaction with both Skidded, and Skidless measurement systems. Several different surface types will be available for the students to see the how adjusting parameters will effect measurement outcomes.

Roughness Metrology with 3D Optical Microscopes Based on White Light Interferometry

Dr. Matt Novak, Bruker-Nano

Abstract: Coherence scanning, or vertical scanning, interferometry (also known as White Light Interferometry, WLI) is a powerful tool for roughness metrology in a variety of cases. Care must be taken, however to understand the best practices and proper setup needed to address surfaces with various texture characteristics. In this tutorial, we will cover some of these important details.

Learning Objectives: How 3D optical microscopes can monitor surface roughness and texture, best practices for magnification selection and expectations for results; basics of filtering and some general information on correlation to stylus instruments used in 2D metrology of surface texture.

Why attend this tutorial? An understanding of best practices enabling proper, accurate roughness and surface texture metrology with 3D optical microscopes is critical to monitoring these quantities for research, development or production use. These best practices also enable closer and more accurate comparison across different types of tools for metrology.

MONDAY TUTORIALS

MAY 12, 2014

Session S (Multi-scale analysis)

Good Practices for the Use of Filters in Profile and Areal Surface Topography

François Blateyron, Digital Surf

Abstract: People tend to use default values and default filters regardless of their specific application. This is usually due to a lack of knowledge on filters. This tutorial focuses on the various filters that can be used in surface topography analysis and the proper way to use them.

Learning Objectives: Why filters are used and how they should be used, What filters are defined in ISO 16610 for profiles and surfaces - the pros and cons of each filter type, How to set the cut-off or nesting index of a filter, What differences exist between ASME, VDA and ISO standards concerning filters. Attendees will learn about the specific advantages of different filter types and how to use them properly depending on their applications.

Why attend this tutorial? Develop strategies for in-line deployment of precision measurement systems.

Multi-scale, Multidomain Characterization

Dr. Suresh Ramasamy, Hutchinson Technology

Abstract: This tutorial will cover the need for multi-scale and multi-domain characterization, basic steps involved with multi-scale characterization and case studies emphasizing the benefits of multi-domain analysis.

Learning Objectives: Understand the benefits of multi-scale and multi-domain characterization, basics of multi-scale analysis and their potential benefits for functional correlation, basics of multi-domain analysis and their potential for product characterization and model development. Understand potential methods for functional correlation and model development from actual surface data.

Multi-scale Geometry and Roughness Characterization

Dr. Christopher Brown, Worcester Polytechnic Institute (WPI)

Abstract: This tutorial presents a multi-scale perspective on roughness that advances the understanding of measurement and analysis of surfaces. It will help you use new technologies to get a competitive advantage where ever surfaces, their performance, manufacture and modification matter. Roughness and chaos are defined simply and clearly relative to scale. Basic geometric properties, including lengths, areas, slopes and curvatures vary with scale on surfaces that have chaotic components. Interactions that control surface performance and processing occur at certain scales.

Learning Objectives: Evaluate equipment, select roughness parameters, appreciate new technologies and find competitive advantages.

Why attend this tutorial? Get a new perspective on roughness and surface metrology that helps to get a competitive advantage with new technology.

TUESDAY TUTORIALS

MAY 13, 2014

Session R (Measurements)

In-line interferometry

Dr. Suresh Ramasamy, Hutchinson Technology

Abstract: This tutorial will cover the basic qualification and validation protocols for deployment of a Coherence Scanning Interferometer as an in-process inspection system for performing both dimensional and surface measurements.

Learning Objectives: Understand the hardware and environment requirements for setting up an in-line system, learn strategies for flexibility enhancement and recipe management, explore long term system control verification.

Why attend this tutorial? Understand potential methods for functional correlation and model development from actual surface data.

Optical Surface Metrology for Clean Air and Automotive Fuel Efficiency

Michael Schmidt, Zygo and Xavier Colonna de Lega, Zygo

Abstract: Mandated improvements in automotive fuel efficiency and reduction of particle emissions have encouraged the development of high-pressure diesel and gasoline injection systems. The resulting tighter manufacturing tolerances and the addition of new functional requirements for operation at up to 2500 bars has created a shift in the required metrology capabilities. This tutorial reviews how these needs are addressed by high-resolution, high-throughput, non-contact, areal surface topography measurements using 3D interference microscopy.

Learning Objectives: At the end of the tutorial, attendees will be able to describe: The manufacturing and metrology challenges facing manufacturers of fuel system components in light of tightening worldwide automotive emission standards, when CSI-based metrology solutions may be preferred over contact or other optical type metrology tools for these applications, How custom CSI-based solutions have evolved over the last 15 years as they gained acceptance on the production floor and inside QC labs around the world.

Why attend this tutorial? Discover how the challenging and evolving metrology needs of fuel injection system manufacturers have forced a transition from tactile to 3D non-contact optical metrology in the span of 15 years.

Measurement Uncertainty and Surface Metrology

Dr. Hy Tran, Sandia National Laboratories, Dr. Christopher Brown, Worcester Polytechnic Institute (WPI), Dr. Suresh Ramasamy, Hutchinson Technology

Calibration of Surface Metrology Instruments

T. Vorburger, Dr. Hy Tran, Sandia National Laboratories, Dr. Christopher Brown, Worcester Polytechnic Institute (WPI), *T. Bergstrom,* Dr. Suresh Ramasamy, Hutchinson Technology

TUESDAY TUTORIALS
MAY 13, 2014
Session S (Multi-scale analysis)

Moving beyond Ra to Find Functional Correlations and Discriminate Surfaces
Dr. Christopher Brown, Worcester Polytechnic Institute (WPI)
Abstract: This tutorial reviews basic experiments and case studies for selecting parameters that can discriminate surfaces by their topographies and can find functional correlations between surface topographies and processing or performance. Conventional height parameters and conventional filtering are frequently not up to this. The ability to find functional correlations and to discriminate surfaces is important value adding activity for surface metrology.
Learning Objectives: Specify parameters for discriminating surfaces, specify roughness parameters that correlate with behavior and for optimizing product design and performance, specify surface roughness parameters that correlate with processing, specify parameters to use in forensics, find competitive advantages using surface metrology.
Why attend this tutorial? Attendees will be able to design experiments that can show how to tell surfaces apart by their topographies and will correlate with processing and performance. This will advance product and process design and quality control.

Characterization of Lay
T. Bergstrom

Corrosion Monitoring Investigations with Fast and Accurate Measurements of Global Corrosion and Corrosion Pits Using White Light Interferometry
Dr. Matt Novak, Bruker-Nano
Abstract: We describe the use of 3D optical profilometry, to achieve accurate and rapid measurement of corrosion on metal coupons. We will share experimental results from measurements taken using a specially configured corrosion monitoring system showing prediction of global corrosion rates as well as identification of corrosion pits at nanometer level.
Learning Objectives: Comprehension of White Light Interferometry 3D microscopy, understand the advantages WLI 3D microscopy provides for corrosion monitoring: high speed and high accuracy, ability to predict both global corrosion rate using WLI 3D microscopy.
Why attend this tutorial? To learn a rapid and highly accurate method of measuring global corrosion and identifying and quantifying corrosion pits that are of concern.

Additive Manufacturing and Surface Modification Techniques with Metal Spray and Thin Film Methods
B. Jared, A. Hall, and D. Hirshfeld

Register Here