

# 3- Day Impact Course

## The Chemistry, Physics & Mechanics of Adhesion Science

May 17-19, 2017

Courtyard by Marriott, Stewart-Newburgh

New York

SCENIC HUDSON VALLEY



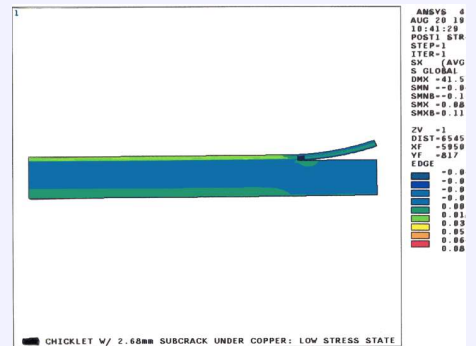
First discovered by Europeans in 1609 when Henry Hudson sailed his ship the Half Moon into Newburgh Bay, the HUDSON VALLEY has since been visited by a long list of remarkable adventurers, explorers and statesmen. These influential men and women determined the early history and culture of America from the 18<sup>th</sup> century onward. From the time of the Revolutionary war when George Washington established his headquarters in a stone fortress in Newburgh on through the tumultuous years of the 19<sup>th</sup> century which witnessed the revolutionary changes brought on by the industrial revolution, the Hudson Valley has been the scene of landmark developments in commerce, technology and American culture.

### Topics to be Covered

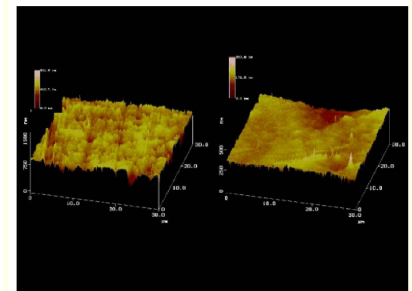
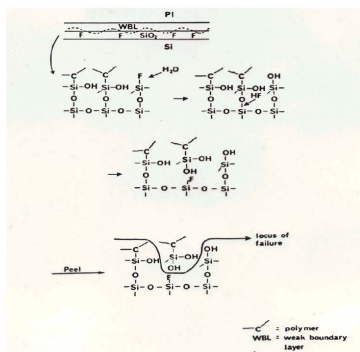
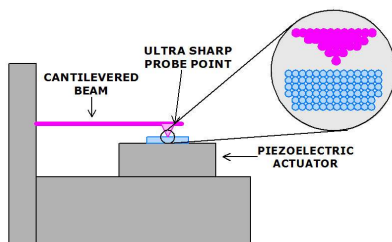
- I. Surface Contamination and Cleaning
- II. Theories or Mechanisms of Adhesion
- III. Contact Angle, Wettability and Adhesion
- IV. Investigation of Interfacial Interactions
- V. Surface Modification Techniques including Plasma
- VI. Ways to improve Adhesion of Organic Coatings
- VII. Silanes and Other Adhesion Promoters
- VIII. Adhesion Aspects of Thin Films
- IX. Adhesion Measurement of Films and Coatings
- X. Basics of Adhesion Measurement
- XI. Residual Stress and Material Mechanical Properties
- XII. Setting Adhesion Requirements for Coating Applications
- XIII. Adhesion Measurement at Atomic and Molecular Level
- XIV. Fundamental Adhesion Applications

### How You Will Benefit From This Course

You will understand advantages and disadvantages of a range of adhesion measurement techniques. You will be able to select the right surface cleaning technique including the use of atmospheric plasmas. You will utilize the concept of acid-base interactions in improving adhesion and acquire basic skills for addressing adhesion failure problems, analyze the alternatives and select the optimum technique for improving adhesion and structure durability. Know where help is available in emergency situations and learn how to select the best measurement technique for a given application.



SCHEMATIC OF ATOMIC FORCE MICROSCOPE



Audience: Scientists and professional staff in R&D, manufacturing, processing, quality control/reliability involved with adhesion aspects of coatings and adhesion sensitive applications.

Level: Beginner- Intermediate; introduction/overview

Prerequisites: Elementary background In chemistry, physics or materials science.

Duration: 3 days

Course fee and materials: \$1,295, includes break refreshments, complete set of lecture notes and copy of handbook and reference guide ADHESION MEASUREMENT METHODS: THEORY AND PRACTICE, (CRC PRESS, 2006)

## Learn From Internationally Recognized Professionals

This course is being taught by Drs. Kash Mittal and Robert Lacombe. Dr. Mittal is an internationally recognized authority on adhesion and surface science topics. He was Editor-in-Chief of the Journal of Adhesion Science and Technology one of the premier international journals in adhesion science for 25 years since 1987 and is currently editor of Reviews of Adhesion and Adhesives a prestigious journal that accepts papers by invitation only. He has also edited over 100 books dealing with all aspects of adhesion and surface and interface technology. His accomplishments in this field have recently been recognized at a special symposium in his honor at the 240th meeting of the American Chemical Society held in Boston, MA, August 2010. He has received many awards and honors and has given this course worldwide.

Dr. Lacombe has been involved in adhesion and surface science technology as a scientist and engineer in the microelectronics industry dealing with problems arising in the development and manufacture of multilevel thin film structures at the heart of modern computer and hand held device technology. He has taught a short course on adhesion measurement methods for the past 15 years and has published an authoritative handbook and reference volume on this topic which will be made available to all students who attend the course.

Drs. Mittal and Lacombe have jointly organized over 60 international symposia dealing with all aspects of adhesion phenomena and surface science and have attracted the participation of the world's leading researchers on these topics. Much of the content of the course has been derived from this long and productive interaction with the world's leading investigators in adhesion and surface science. It is expected that the student will benefit not only from the extensive experience of the instructors but also from face to face discussions on topics of particular interest.

## Adhesion's Important Role Today

Adhesion plays an important role in many technologies and industries, viz., aerospace, microelectronics, automotive, thin films, optics, coatings, paint and so on. Broadly speaking, the topic can be divided into two categories: film or coating/substrate combination and adhesive joints. Films and coating are used for a variety of purposes and irrespective of their intended function, these must adhere adequately to the underlying substrate. So the need for understanding and controlling the factors affecting adhesion is quite patent.

Furthermore, the durability of the bond (on exposure to process chemicals, moisture, corrosives, etc.) is of paramount concern and importance. This course presents an overview of the chemistry, physics and mechanics of adhesion in regard to understanding fundamental adhesion mechanisms. You will learn how to improve and control them and the latest adhesion measurement techniques which are being used to evaluate the PRACTICAL ADHESION of coatings and laminate structures.

Emphasis is given to methods which can be carried out in a manufacturing environment as well as in the lab environment which give results that are directly relevant to the durability and performance of the structures under investigation. The effects of coating elastic properties and residual stress are considered as well as other external influences which affect durability under use conditions.

## INSTRUCTORS AND CONTACT INFORMATION

Dr. K. L. Mittal & Dr. R. H. Lacombe  
3 Hammer Drive  
Hopewell Junction, NY 12533  
Tel. 845-897-1654 & 845-227-7026

E-mail: [klm@mstconf.com](mailto:klm@mstconf.com) ; [rhl@mstconf.com](mailto:rhl@mstconf.com)

For detailed information and registration: [www.mstconf.com/AdhesionCourse.htm](http://www.mstconf.com/AdhesionCourse.htm)