

WOOD C&S

2018

8th Wood Coatings and Substrates Conference

When and Where:

Thursday & Friday, September 20 & 21, 2018
The University of North Carolina at
Greensboro
Elliott University Center
507 Stirling St, Greensboro, NC 27412
Cone Ballroom

Featuring:

Industry and Research experts discussing new changes in
wood substrates
Expert Speakers on coatings science, raw materials, and
technology for wood coatings

Sponsored by:

University of North Carolina at Greensboro
Piedmont Society for Coatings Technology
Wood Coatings Research Group

Keynote Speakers:

**Thursday: Wood Polymer Science, Basic Principles and
Contemporary Challenges**
Professor Charles E. Frazier
Thomas M. Brooks Professor of Sustainable Biomaterials;
Director, Wood-Based Composites Center; Ph.D. (Virginia Tech)

Friday: Nanostructured and Smart Coatings
Professor Rigoberto Advincula, Ph.D.
Case Western Reserve University
Dept. of Macromolecular Sci. & Eng.

Who should attend Wood C&S?

- Chemists and Formulators dedicated to improving wood coating performance and ease of manufacture.
- Raw material and equipment suppliers requiring competency in the wood and wood coatings discipline.
- Students interested in pursuing a career in the coatings, material sciences, and chemical sciences disciplines.
- Educators interested in the wood coatings market and related material science technologies.
- End users who need coatings to add value to their products.

Complete **WOOD C&S** Conference Information:

r.obie@woodcoatingsresearchgroup.com

<http://www.uncg.edu>

https://piedmontsociety.com/PSCTHome_Page.html

For abstracts, registration information, directions, maps and corporate sponsors contact:

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WOOD C&S 2018

Program Overview

	Thursday Sept 20, Cone Ballroom-A New Developments in Green Coatings Technology
1:00 - 1:30 p.m.	A Family of Waterbased Acrylics Based on a Unique Self-Crosslinking Mechanism Dana Charron Interpolymer Corp (a Zschimmer & Schwarz Company)
1:30 - 2:00 p.m.	Water-Borne Urethane Based on Renewable Resources for Wood Coatings Allen Burbank Poynt
2:00 – 2:30 p.m.	Developments in Amine Free Water-Based Polyurethane Dispersions David Folkman Alberdingk Boley
2:30 – 3:00 p.m.	Improving Application and Film Properties in Waterbased Wood Formulations with a Highly Pseudoplastic HEUR Lori Howell Coatex
3:00 – 3:15 p.m.	Break
3:15 - 4:15 p.m.	KEYNOTE ADDRESS Wood Polymer Science, Basic Principles and Contemporary Challenges Dr. Charles Frazier Charles Frazier is the T.M. Brooks Professor of Sustainable Biomaterials at Virginia Tech. His research and teaching focus on plant polymer science with particular emphasis on wood chemistry as related to the manufacture of wood-based composites. He is the Director of the Wood-Based Composites Center, a National Science Foundation Industry/University Cooperative Research Center. Now in his 26 th year at Virginia Tech, some of Frazier's research interests include plant polymer rheology, wood/resin interactions, and lignin chemistry as related to the formation of biogenic formaldehyde.
4:15 – 5:45 p.m.	Sponsor Table Top Exhibits and Networking
7:00 p.m. - Until	PSCT Scholarship Fundraising Dinner – Open to all; RSVP at time of Registration Sammy G's Tavern

WOOD C&S 2016

Program Overview

	Friday Sept 21, Cone Ballroom
	Cone Ballroom-A Chemistry and Physical Chemistry of Coatings
8:00 – 8:15 a.m.	Welcome
8:15 - 8:45 a.m.	Colorful Solvent-Free Radiation-Curable Wood Coatings Marcel Krohnen BYK-Chemie GmbH, Wesel Germany
8:45 – 9:15 a.m.	Engineered Transparent Mineral Filler Technologies in UV Cure Coatings to Optimize Photoinitiator Usage, UV Cure Acceleration, Economics, Matting Effects and Abrasion Resistance Scott Van Remortel Sibelco Corporation
9:15 – 9:45 a.m.	Responding to Challenges in testing Wood Coatings and Finished Wood Substrates Marek Gnatowski, Karen Murphy, Douglas Creelman, Ying H. Chui, and Judy LaZonby Polymer Engineering Company Ltd
9:45 – 10:00 a.m.	Break
10:00 – 10:30 a.m.	Novel Applications of Confocal Microscopy Techniques in Coatings Research Doug Mall, Wenjun Wu, Dana Garcia, and Jeffrey Schneider Arkema Inc.
10:30 – 11:00 a.m.	Understanding the Processing-Structure-Property Relationships in Spray and Wipe Stains on wood Dr. Brent Neal Akzo Nobel
11:00 a.m.– 11:30 a.m.	Evaporative Dynamic Oscillation (EDOT) to Probe Drying and Film Formation Ronald Obie ADEPT Material Science
11:30 a.m. – 12:55 p.m.	Open Lunch, Table Top Exhibits, and Networking
1:00 – 2:00 p.m.	KEYNOTE ADDRESS Nanostructured and Smart Coatings Professor Rigoberto C. Advincula Case Western Reserve University Department of Macromolecular Science and Engineering Cleveland, OH Rigoberto Advincula is Professor at Case Western Reserve University in Cleveland, Ohio, USA. He is a Fellow of the American Chemical Society (ACS), Fellow of the Polymer Science and Engineering Division (ACS), Fellow of the Polymer Chemistry Division (ACS). He is also a member of NACE, SPE, ERG, MRS, and AAAS and a frequently sought out speaker and expert in polymer materials, coatings, and sensors. He received the Herman Mark Scholar Award in 2013 from the ACS. He is Editor in chief of MRS Communications and also former Editor of Reactive and Functional Polymers and Polymer Reviews. He sits and has previously served on the Editorial Board of a number of other major polymer journals. He was Chair of the Polymer Chemistry Division, American Chemical Society in 2015 and is a Committee Chair with NACE. His group does research in polymer materials, nanocomposites, colloidal science, hybrid materials, and ultrathin films towards applications from display coatings to biomedical devices. He consults for a number of companies focusing on the most challenging problems and definition of structure-property relationships towards commercial applications. Currently, he is director of PETRO Case a Consortium dealing with the challenging materials problems of the Oil and Gas Industry.

Thursday Sept 20, Cone Ballroom-A

1:00 p.m.

A Family of Waterbased Acrylics Based on a Unique Self-Crosslinking Mechanism

Dana Charron

Interpolymer Corp (a Zschimmer & Schwarz Company)

A family of waterbased acrylics based on a unique dual self-crosslinking mechanism will be presented that offer high-performance solutions across a variety of coating applications. These acrylics are characterized by physical testing properties that are much higher than traditional waterbased acrylics. Application formulas have also been developed for use on multiple substrates including wood, concrete, paper and plastic, offering high performance and versatility within this family of waterbased acrylics.

1:30 p.m.

Water-Borne Urethane Based on Renewable Resources for Wood Coatings

Allen Burbank

Poynt

Oil Modified Urethane (OMU) and uralkyd technology has been widely used in a variety of wood coatings for more than half a century due to the performance properties, ease of application and renewable raw material content. Conventional solvent based products typically have a VOC of 450 g/L or higher, so as VOC regulations tighten, water-borne technology is becoming more desirable and necessary.

This presentation will compare the performance properties of self-crosslinking water-borne OMUs to conventional solvent-borne systems as well as conventional polyurethane dispersions (PUD) to show how the technology has advanced over the years. Also compared will be different generations of water-borne OMU technology. As we move away from the early days where NMP co-solvent, lower solids and higher VOC systems were the only options, we have developed an advanced NMP free, higher solids, low VOC urethane that maintains outstanding physical properties.

2:00 p.m.

Developments in Amine Free Water-Based Polyurethane Dispersions

David Folkman

Alberdingk Boley

More environmentally friendly and "greener" approaches to finishing are being driven by stricter regulations and by consumer demand. This focus has resulted in a wide variety of new and improving technologies being developed to meet performance requirements while complying with environmental regulations. To meet this demand a novel class of amine free water based polyurethane dispersions (PUD) has been developed. These novel resins eschew the traditional amine neutralizers to produce a VOC free PUD. These resins can be combined with non-hazardous air polluting solvents and carbodiimide crosslinkers to produce a hard, tough, and chemical resistant finish. This talk will focus on using this resin as both a furniture and wood floor coating.

2:30 p.m.

Improving Application and Film Properties in Waterbased Wood Formulations with a Highly Pseudoplastic HEUR

Lori Howell

Coatex

Hydrophobic Ethoxylated URethane (HEUR) thickeners are well known for their ability to impart a superior application feel to waterbased coatings with excellent leveling, film build and spatter resistance. This property is often considered contradictory to high sag resistance and anti-settling properties. The new chemistry discussed has a strong shear thinning rheology profile that builds rheology at shear rates well below those measured by a Brookfield Viscometer and additionally contributes to a higher G' or storage modulus. Through impacting only the low shear viscosity, this HEUR can prevent sedimentation and syneresis. Additionally the chemistry has a strong shear thinning behavior allowing great sprayability and minimal impact on flow and leveling especially compared to competitive chemistries like HEC and ASE. Super low shear rheology measurements and oscillatory rheology methods for determining the visco-elastic behavior will be used to quantify the application changes observed in wood primer and wood topcoat examples.

KEYNOTE ADDRESS

3:15 p.m. Cone Ballroom - A

Wood Polymer Science, Basic Principles and Contemporary Challenges

Dr. Charles Frazier

T.M. Brooks Professor of Sustainable Biomaterials, Virginia Tech

Starting from the evolution of life on Earth, wood chemistry and properties will be presented in a materials science context. Aspects of wood anatomy, wood/water relationships, and surface chemistry will be touched upon to help understand wood processing technologies including liquid penetration into wood, and wood thermochemistry.

Friday Sept 21, Cone Ballroom-A

8:15 a.m.

Colorful Solvent-Free Radiation-Curable Wood Coatings

Marcel Krohnen

BYK-Chemie GmbH, Wesel Germany

UV curing is one of the fastest growing technologies worldwide, with a predicted growth of >7% annually and has gained increasing importance for wood and furniture coatings as alternative technology to conventional systems. Once mainly formulated as clear primer or clear topcoat, solvent-free radiation-curable wood coatings become more and more colorful.

The efficient wetting and long-lasting stabilization of a broad pigment variety is of utmost importance to achieve high-quality colored radiation-curable wood coatings with highest color strength, excellent gloss and lowest haze as well as best transparency or hiding power, respectively. These requirements come along with the need for pigment dispersions that utilize the highest pigment loading possible, are compatible in a broad range of commonly used monomers and oligomers, and provide long-term stability without any viscosity shift upon storage.

The application of wetting and dispersing additives to achieve these challenging demands is state-of-the-art, however, tailor-made products are needed to meet all technical requirements as well as to offer solvent-free delivery form which does not contribute any volatile solvents to the coatings formulations.

The presentation presents a solvent-free wetting and dispersing additive that has been perfectly tailored to the needs of colored solvent-free radiation-curable wood coatings. A benchmark study versus conventional wetting and dispersing is provided which show the advanced performance of this wetting and dispersing additive for different technical criteria – from grinding time reduction over enhanced storage stability for pigment dispersions to improved coloristic properties in the final formulations.

8:45 a.m.

Engineered Transparent Mineral Filler Technologies in UV Cure Coatings to Optimize Photoinitiator Usage, UV Cure Acceleration, Economics, Matting Effects and Abrasion Resistance

Scott Van Remortel

Sibelco Corporation

This presentation discusses novel mineral filler technologies based on engineered sizes of transparent nepheline syenite fillers and additives to assist UV coatings formulator in optimizing UV cure rate, photoinitiator usage, raw material costs combine with mechanical and optical improvements in Aqueous PUD and 100% solids systems. With the tightening of photoinitiator availability, rising cost of UV coating raw materials, and trend towards low energy LED curing, the topic is a timely one for the UV Coatings Industry.

9:15 a.m.

Responding to Challenges in testing Wood Coatings and Finished Wood Substrates
Marek Gnatowski, Karen Murphy, Douglas Creelman, Ying H. Chui, and Judy LaZonby
Polymer Engineering Company Ltd

Material testing is an important element in the research and development of new products and should be implemented in quality control during manufacturing, selection of appropriate coatings and finished substrate failure analysis. Regardless of the test, it is critical that when the testing procedures are conducted at various locations by different professionals, properties are evaluated similarly, and consistent results are supplied so they will be widely accepted. There are significant challenges when testing coatings for wood substrates because of the specific nature and natural variability of wood, as well as the wide variety of engineered wood-based products which have entered the market. In addition, coatings failures are often a long-term phenomenon necessitating the use of accelerated durability elements in the test procedures. In this presentation, the specific properties of wood and their impact on coating finishes will be discussed. The focus will be on challenges of wood coatings and finished wood-based substrate properties and selecting the appropriate tests for the end-use. The importance of test procedure standardization will also be emphasized, as well as different approaches to developing testing procedures adopted by national and international standardization committees. Examples of the improvement to testing standards over time, as well as specific challenges to wood coating standards will be shown. To meet present and future testing standardization needs, a strong group of experts, representing a wide range of coating and wood-coated product industry members, that include material/equipment suppliers, manufacturers, end-users, and technical professionals, is needed.

10:00 a.m.

Novel Applications of Confocal Microscopy Techniques in Coatings Research
Doug Mall, Wenjun Wu, Dana Garcia, and Jeffrey Schneider
Arkema Inc.

“This paper explores the applications of two confocal microscopy techniques in coatings research: confocal Raman microscopy (CRM) and confocal laser scanning microscopy (CLSM)”

10:30 a.m.

Understanding the Processing-Structure-Property Relationships in Spray and Wipe Stains on wood
Dr. Brent Neal
Akzo Nobel

Finishing wood with pigmented stains often requires a tedious manual wiping process to achieve superior aesthetics. To improve the process efficiency in wood finishing plants, it is desirable to use a spray application method. Understanding the the processing-structure-property relationships in spray and wipe stains is a critical part of understanding how to formulate spray stains with superior aesthetics. Micro x-ray tomography and fluorescence microscopy were used to analyze the depth of penetration and film characteristics of sprayed and wiped stains containing pigments. Our results indicate that the key differences are due to film uniformity rather than depth of penetration.

11:00 a.m.

Evaporative Dynamic Oscillation (EDOT) to Probe Drying and Film Formation
Ronald Obie
ADEPT Material Science

Acrylic emulsion polymerization offers the ability to engineer polymers with unique molecular architecture and morphology. Additionally, polymers can be developed with very high molecular weights, thus theoretically increasing physical properties of the polymer. However, in water based coatings based on such polymers, resultant physical properties are especially dependent upon the quality of the film formed. In this study, we investigate the impact of coalescent concentration on dry and film formation of an acrylic polymer utilizing the Evaporative Dynamic Oscillation Technique (EDOT).

KEYNOTE ADDRESS

1:00 p.m. Cone Ballroom - A

Nanostructured and Smart Coatings

Professor Rigoberto C. Advincula

Case Western Reserve University

Department of Macromolecular Science and Engineering

Cleveland, OH

Coatings are an integral part of modern society since they provide both barrier and packaging applications in its basic function. Many types and classifications of coatings can be differentiated by formulation, methods of deposition, or by industry. Their methods of coating are commensurate with their intended application. However, it is useful to think that coatings are essentially nanoscopic phenomena that have been translated to macroscopic visibility. Although nanoscopic events can either multiply into improved performance (synergistic) or failure (non-synergistic). Nanostructuring enables the development of new coatings and function since it alters the way a coating is able to function at the interface in its most ultrathin form. This can be by way of morphology, patterning, templating, etc. The chemistry or composition of the coating can be synthesized or formulated in such a manner that they are congruent with stimuli-responsive, self-healing, or highly efficient (high performance) properties.

The University of North Carolina at Greensboro
The Wood Coatings Research Group
The Piedmont Society for Coatings Technology

Eighth Wood Coatings and Substrates Conference

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Location: The University of North Carolina at Greensboro
Elliott University Center
Cone Ballroom
540 Stirling Street, Greensboro, NC 27412

Directions: <https://parking.uncg.edu/access/access.html>

Registration Form

Online registration at https://piedmontsociety.com/Wood_C_S_Registration.html

Seating is limited, so register early

Last Name _____ First Name _____

Company or Affiliation _____

Mailing Address _____

Phone _____ Fax _____ Email _____

Registration Fee: The Cost of the Conference is Free.

A \$20 donation to the Piedmont Society Scholarship Fund is requested for admission to the Conference in lieu of a registration fee.

Parking: Parking is available in parking decks throughout the campus for \$10.00/day.

The recommended parking deck is the Oakland Avenue Parking Deck.

See <https://parking.uncg.edu/access/access.html> for other locations

Lunch: There is a wide range of Restaurants within EUC and within walking distance of the UNCG Campus for lunch Thursday. An open lunch will be provided Friday to allow opportunity for networking and visiting Sponsor booths.

Questions: Please direct your questions to: Ron Obie

r.obie@woodcoatingsresearchgroup.com

Please Return The Completed Form to:

Ronald Obie

Email: r.obie@woodcoatingsresearchgroup.com

WOOD C&S 2018 CONFERENCE COMMITTEE

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