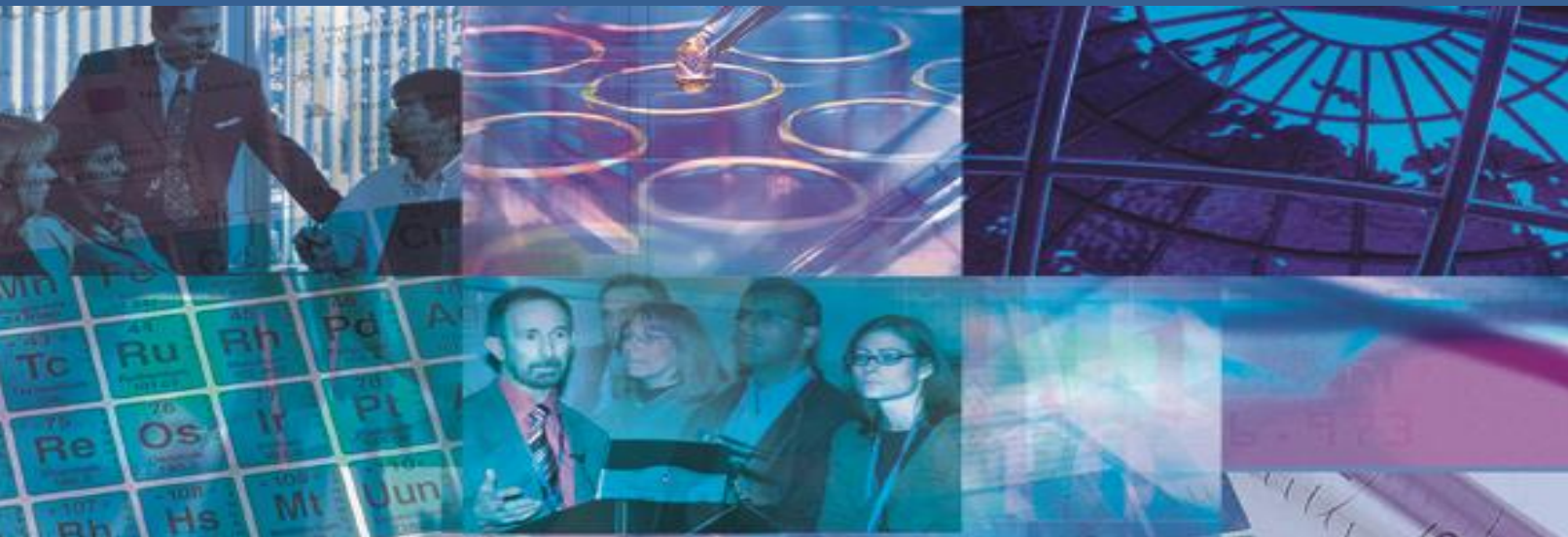


191st Technical Meeting

April 25-27, 2017

DoubleTree by Hilton; Beachwood, OH



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International Rubber & Advanced Materials In Healthcare Expo,
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Our International Elastomer Conference is the premier place where customers, suppliers of materials, equipment, tools and services, and educators come together. This event is the one place, one time of year, where you find the best of the best of our industry all under one roof. It provides a forum for the exchange of ideas, observations, regulatory reforms and emerging scientific technologies, as well as learning, networking, seeing current customers and making new ones.



Technical Meeting Topics:

- Mixing & Processing Technology • Tire Testing and Tire Performance Predictions • Thermoplastics Elastomers • Advances in Material and Processes of Car and Truck Tires • Industrial Rubber Goods: Hose, Belts, Wire & Cable, Auto Parts • Contributed Session • Characterization Tools for Elastomers • Civil Engineering with Rubber-Construction, Roofing, Seal, Gasket • 4 R's – Reduce, Reuse, Recycle, Renew of Rubber • Heavy Duty Tires – Truck Tires, Off-Road, Agriculture Tires • Elastomers for Extreme Environments • Foam and Adhesive • Functionalized Elastomer and Additives • Rubber Pavement Interactions – Characterization of the Pavement Surface • New Commercial Developments

Educational Symposium Courses:

- Material Considerations for Medical Devices and Pharmaceutical Products • Essentials of Rubber Technology • Chemistry and Technology of Polymeric Materials Used in Medical Devices • Silicone Rubber Chemistry and Technology • Chemistry & Technology of Polyurethane Elastomers • Compounding Mixing and Consistency • Establishing a Rubber Molding Process • Failure Analysis of Rubber & Plastics by Physical and Chemical Analysis • Chemical Structures and Viscoelasticity of Rubber

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Machinery and Equipment, Chemical Suppliers, Rubber Processing, Natural and Synthetic Rubber, Raw Materials Suppliers, Testing and Research, Mold Release Agents, Molding, Extrusion and Parts Production, Custom Services, Compounding and Mixing Services, Manufacturing or Distribution, Recycling, Advanced Materials in Healthcare, TPEs

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Visit rubberiec.org for details.

Huntington Convention Center of Cleveland • Cleveland, OH USA

Special Events

Table Top Exhibits

Tuesday, April 25; in Ballroom 4-6, 1st Floor during Technical Meeting breaks, lunchtime and during Welcome Reception
Speak to some of the best companies in our industry, learn what they have to offer.

Keynote Address

Tuesday, April 25; 11:00 a.m. – 12:00 p.m.; Ballroom 1-3, 1st Floor
Kurt Aerts – Vice President, Specialty Elastomers & Butyl, ExxonMobil Chemical
Keynote Topic: Leading through Innovation - Foundation for Success in Synthetic Rubber

25-Year Club Luncheon

Tuesday, April 25; 12:00 p.m. – 1:30 p.m.; Sanctuary Wine Bar, 1st Floor
Seating is limited - \$60 per person; Reservations are required.
Come celebrate individuals who have been active in the rubber industry for 25 consecutive years or more. All are invited.

Welcome Reception

Tuesday, April 25; 5:15 p.m. – 7:00 p.m.; Ballroom 4-6, 1st Floor
All registered attendees are invited to attend. Enjoy some networking time with fellow attendees.

5K Walk/Run – Presented by H.M. Royal

Wednesday, April 26; 6:30 a.m. Check-in at DoubleTree by Hilton lobby
Runners, walkers, spouses and guests are invited to participate. You must register to attend.

Science & Technology Awards Banquet

Wednesday, April 26; 12:00 p.m. – 2:00 p.m.; Ballroom 5 & 6, 1st Floor
Show your support of our 2017 Science & Technology Award winners as they are honored at this banquet.
\$60 per ticket if not already included in your registration type.

Business & Awards Meeting

Thursday, April 27; 11:00 a.m. – 12:00 p.m.; Ballroom 6, 1st Floor
Please join us at the semi-annual Business & Awards Meeting of Rubber Division, ACS.
It includes general business of the Division, plus presentation of additional Division awards.

Technical Meeting Policies

- Videotaping or photographing any portion of a technical presentation is strictly prohibited. Violators of this policy will be asked to leave and will not be allowed back into the meeting.
- Complimentary presentations download from this meeting: You will receive an email around April 29th with instructions for downloading the papers presented at this meeting.
- You are required to wear your badge for entrance to the technical sessions.

Schedule of Events

Day/Time	Event	Location
Monday, April 24		
8:00 a.m. – 9:00 a.m.	Steering Committee Breakfast*	Sanctuary Wine Bar Private Dining, 1 st Floor
9:00 a.m. – 12:00 p.m.	Steering Committee Meeting*	South Room, 1 st Floor
12:00 p.m. – 5:00 p.m.	Registration	Ballroom Foyer, 1 st Floor
1:30 p.m. – 3:00 p.m.	Membership Committee Meeting	South Room, 1 st Floor
2:00 p.m. – 5:00 p.m.	Program Planning Committee Meeting	North Room, 1 st Floor
3:00 p.m. – 4:00 p.m.	S&T Committee Meeting*	South Room, 1 st Floor
Tuesday, April 25		
7:30 a.m. – 4:30 p.m.	Registration	Ballroom Foyer, 1 st Floor
8:00 a.m. – 5:15 p.m.	Technical Session	Ballroom 1-3, 1 st Floor
9:00 a.m. – 11:00 a.m.	Strategic Partnership Committee Meeting	North Room, 1 st Floor
9:30 a.m. – 9:45 a.m.	Table Top Exhibits during Tech Meeting Break	Ballroom 4-6, 1 st Floor
10:00 a.m. – 11:00 a.m.	Marketing Committee Meeting	South Room, 1 st Floor
11:00 a.m. – 12:00 p.m.	Keynote Address Kurt Aerts, Vice President Specialty Elastomers & Butyl, ExxonMobil Chemical	Ballroom 1-3, 1st Floor
12:00 p.m. – 1:30 p.m.	25-Year Club Luncheon	Sanctuary Wine Bar, 1 st Floor
12:00 p.m. – 1:30 p.m.	Table Top Exhibits during Lunch Break	Ballroom 4-6, 1 st Floor
1:30 p.m. – 3:30 p.m.	Exhibits & Meeting Sites Committee Meeting	South Room, 1 st Floor
3:00 p.m. – 5:00 p.m.	Area Directors Caucus*	North Room, 1 st Floor
3:30 p.m. – 3:45 p.m.	Table Top Exhibits during Tech Meeting Break	Ballroom 4-6, 1 st Floor
5:15 p.m. – 7:00 p.m.	Welcome Reception & Table Top Exhibits	Ballroom 4-6, 1 st Floor
Wednesday, April 26		
Check-in 6:30 a.m.	5K Walk/Run - Presented by H.M. Royal, Inc.	Meet in DoubleTree by Hilton Lobby
7:00 a.m. – 4:30 p.m.	Registration	Ballroom Foyer, 1 st Floor
7:30 a.m. – 12:00 p.m.	Technical Session	Ballroom 1-3, 1 st Floor
10:00 a.m. – 11:00 a.m.	Finance & Budget Committee Meeting*	South Room, 1 st Floor
12:00 p.m. – 2:00 p.m.	Science & Technology Awards Banquet	Ballroom 5 & 6, 1 st Floor
2:15 p.m. – 6:00 p.m.	Technical Session – S&T Presentations	Ballroom 1-3, 1 st Floor
3:30 p.m. – 4:30 p.m.	Area Directors Meeting*	North Room, 1 st Floor
Thursday, April 27		
7:00 a.m. – 4:00 p.m.	Registration	Ballroom Foyer, 1 st Floor
7:30 a.m. – 5:00 p.m.	Technical Session	Ballroom 1-3, 1 st Floor
9:00 a.m. – 10:45 a.m.	Executive Committee Meeting	Ballroom 6, 1 st Floor
11:00 a.m. – 12:00 p.m.	Business & Awards Meeting	Ballroom 6, 1 st Floor

* Closed Meeting

Rubber Division, ACS members are welcome to attend all open committee meetings.

Tuesday, April 25 – Ballroom 1-3, 1st Floor

CRYSTALLIZATION OF RUBBER

Chair: **C. Michael Roland, Naval Research Laboratory**

- 8:00 a.m. Crystallite Growth Enhances Segmental Dynamics in Star-Shaped Semi-Crystalline Polymer - **Martin Tress**, University of Tennessee Knoxville
- 8:30 a.m. Application of Dielectric Spectroscopy for Investigation of Crystallization Kinetics of Supercooled Liquids at Elevated Pressure - **Marian Paluch**, University of Silesia, Poland
- 9:00 a.m. New Concept of Strain-Induced Crystallization in Cross-Linked Natural Rubber - **Masatoshi Tosaka**, Kyoto University, Japan
- 9:30 a.m. **Break & Table Top Exhibits in Ballroom 4-6**
- 9:45 a.m. Crystallization Tendencies of Glass-Forming Liquids: High Pressure Versus Nanoscale Confinement - **Karolina Adrjanowicz**, University of Silesia, Poland
- 10:15 a.m. Dynamics and Thermodynamics Along the Melting Line - **C. Michael Roland**, Naval Research Lab

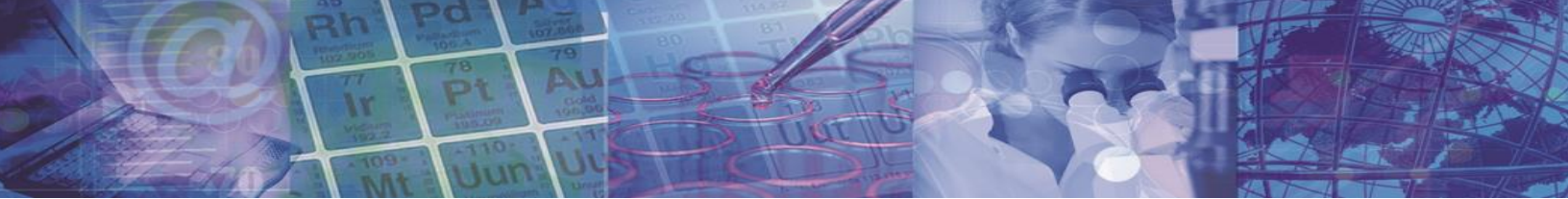
11:00 a.m. – 12:00 p.m. KEYNOTE ADDRESS (Open To All Attendees):



Topic: Leading Through Innovation – Foundation for Success in Synthetic Rubber

Kurt Aerts was appointed vice president of the global Specialty Elastomers & Butyl rubber business in June of 2015. In this role, he is accountable for the operational and financial business results in the short term, as well as the development and implementation of the longer-term business strategies. Mr. Aerts previously was vice president of ExxonMobil Chemicals' global supply chain operations from 2013-2015 and before that was vice president of the global adhesion industry business from 2011-2013. In the earlier part of his career, he has held several leadership positions across Europe, Asia-Pacific and the United States since joining the company in 1992 as a contact engineer at the Antwerp Polymers Plant in Belgium. Between 1995 and 2006, he held various roles in polyethylene sales and marketing and as feedstock and supply manager in Basic Chemicals in Belgium and the Netherlands. During this time, he also moved to Houston for the first time as polyethylene business planning manager. In January 2006, he moved to Shanghai where he served as Asia Pacific regional polyolefins sales manager. During his time in China, Mr. Aerts was instrumental in recruiting and assimilation of new hires and supported the Shanghai Technology Center project. After 3.5 rewarding years in China, he returned to Houston in 2009 as a senior planning advisor. Mr. Aerts received a master's degree in chemical engineering from University of Leuven (Belgium). He is married with two daughters and enjoys spending time with family, traveling, exercising and reading.

- 1:30 p.m. Advanced Analysis of Crystallization Kinetics and Tear Fatigue Behavior of Natural Rubber - **G. Heinrich**, Leibniz Institute of Polymer Research Dresden, Germany
- 2:00 p.m. Measuring the Durability Benefit of Strain Crystallization Via Crack Arrest Experiments - **William Mars**, Endurica LLC
- 2:30 p.m. Strain Induced Crystallisation during Crack Propagation, Consequence of Thermo-Oxydative Aging - **Laurent Chazeau**, Laboratoire MATEIS INSA de LYON, France
- 3:00 p.m. The Effect of Strain-Induced Crystallization on the Thermomechanical Behaviour of Rubbers - **Jean-Benoit LE CAM**, University of Rennes 1, France
- 3:30 p.m. **Break & Table Top Exhibits in Ballroom 4-6**
- 3:45 p.m. Shape-Memory and Self-Stretching Thermoset Elastomers - **Mitchell Anthamatten**, University of Rochester
- 4:15 p.m. Structure of Filled Natural Rubber Near the Tip of a Fatigue Crack - **Costantino Creton**, ESPCI Paris, France
- 4:45 p.m. Crystallization of Natural Rubber - **Shinzo Kohjiya**, Kyoto University, Japan



Wednesday, April 26 – Ballroom 1-3, 1st Floor

NANOTECHNOLOGY AND NANOCOMPOSITES

Chair: Christopher G. Robertson, Cooper Tire & Rubber Company

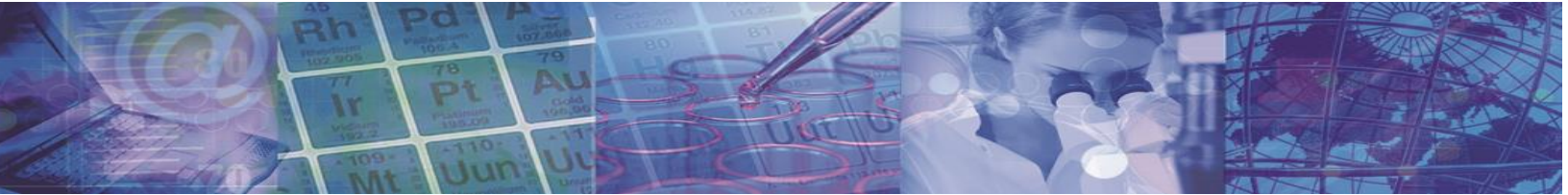
- 7:30 a.m. Preparation and Properties of Natural Rubber with Organic-Inorganic Nanomatrix Structure - **Seiichi Kawahara**, Nagaoka University of Technology, Japan
- 8:00 a.m. Small-Angle Scattering Analysis of the Structure of Chains and Filler in Polymer Nanocomposites - **Julian Oberdisse**, CNRS/University of Montpellier, France
- 8:30 a.m. Local, Global, and Particle Dynamics in Polypropylene Glycol / Silica Nanocomposites - **Mike Roland**, Naval Research Lab
- 9:00 a.m. Insights into Filler-Induced Toughening from Molecular Dynamics Simulations - **Scott Smith**, The University of Akron
- 9:30 a.m. Natural Rubber Nanocomposites with Segregated and Random Network of Multiwalled Carbon Nanotube/Nanosilica Hybrid Fillers - **Rani Joseph**, Cochin University of Science and Technology, India
- 10:00 a.m. Break
- 10:15 a.m. Enhancing Elastomeric Performance and Application Window for Thermoplastic Polyurethanes (TPU) By Incorporation of Carbon Nanotubes (CNTs) - **Vahab Solouki Bonab**, Case Western Reserve University
- 10:45 a.m. Preparation of Natural Rubber with Nanodiamond Nanomatrix Structure - **Asangi Gannoruwa**, Nagaoka University of Technology, Japan
- 11:15 a.m. Graphene-Reinforced Rubber for Energy Efficient (Low RR) Tires - **Roger Aronow**, Vorbeck Materials Corp.

SCIENCE & TECHNOLOGY AWARD WINNERS

Chair: Dr. Maria D. Ellul, ExxonMobil Chemical Co.

- 2:15 p.m. Charles Goodyear Medal - **Dr. Judit E. Puskas**, Rubber City Girl – the Path to the Goodyear Medal
- 3:15 p.m. Melvin Mooney Award for Distinguished Technology - **Dr. David J. Lohse**, Developing New Rubber Products Based on Polymer Physics Principles
- 3:45 p.m. Sparks-Thomas Award - **Dr. Juan L. Valentin**, Molecular Evidences in Rubber Science and Technology by Means of Time-domain NMR Experiments
- 4:15 p.m. Break
- 4:30 p.m. George Stafford Whitby Award for Distinguished Teaching and Research - **Dr. Sadhan C. Jana**, New Strategies of Silica and Carbon Black Dispersion in Tire Tread Compounds
- 5:00 p.m. Chemistry of Thermoplastic Elastomers Award - **Dr. Jimmy Mays**, New Thermoplastic Elastomers with Enhanced Elongation at Break, Elastic Recovery, and Upper Use Temperature
- 5:30 p.m. Fernley H. Banbury Award - **Richard J. Jorkasky**, Mixing Parameters: The Rubber Mixer's Tool Belt





Thursday, April 27 – Ballroom 1-3, 1st Floor

CARBON FOOTPRINT AND SUSTAINABILITY

Chair: Kenneth Bates, Struktol Company of America

- 7:30 a.m. Sustainable Plasticizer for Butyl Rubber Cured by Phenolic Resin - **Jiaxi Li**, The University of Akron
- 8:00 a.m. Now You See It, Now You Don't – the Magic of Dry Ice in Rubber Molding - **Steve Wilson**, Cold Jet
- 8:30 a.m. Sustainable Tire Materials - Myth or Reality? - **Chad Jasiunas**, Leigh Technologies
- 9:00 a.m. Challenges in the Use of Recycled Rubber in Automotive Applications - **Janice Tardiff**, Ford Motor Company
- 9:30 a.m. Investigation of fatty acids as renewable fillers for elastomers - **Kevin Cavicchi**, The University of Akron
- 10:00 a.m. Break

CONTRIBUTED SESSION

Chairs: C. Jeffrey Lin, Monolith Materials

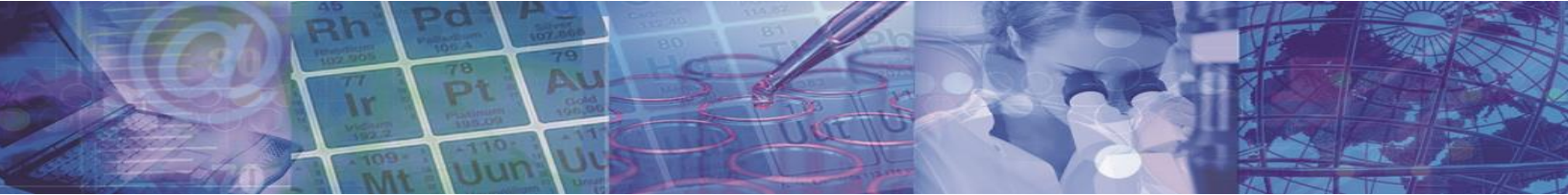
- 10:15 a.m. A New Algorithm for Baseline Subtraction for Spectra - **Sanjoy Datta**, Tomas Bata University in Zlin, Czech Republic
- 10:45 a.m. Characterization of Brominated Natural Rubber by Solution State 2D NMR Spectroscopy - **Nuorn Choothong**, Nagaoka University of Technology, Japan
- 11:15 a.m. Critical Time-Dependent Evaluation and Modeling of Rubber Stopper Seal Performance for Drug Product Life Cycle - **Qingyu Zeng**, West Pharmaceutical Services, Inc.
- 11:45 a.m. Effect of Immersion Fluid Changes on Essential Properties of Common Static Sealing Rubbers - **Joe Walker**, Freudenberg-NOK Sealing Technologies
- 12:15 p.m. Lunch Break
- 1:00 p.m. RPA: Linking Linear and Non-Linear Rheological Measurements to Rubber Processing Solutions for Elastomeric Product Development – **Gregory Kamykowski**, TA Instruments
- 1:30 p.m. Comparisons of Sulfur, Selenium, and Tellurium Cure Systems in Natural Rubber - **RJ Del Vecchio**, Technical Consulting Services

NEW TIRE CONCEPTS & MATERIALS

Chair: Howard Colvin, Cooper Tire & Rubber Company

- 2:15 p.m. Characterization of Rubber and Tire by Netzsch Gabo Instrument Series - **Yanxi Zhang**, Netzsch Instruments North America, LLC
- 2:45 p.m. Application of Thermal Analysis and Related Techniques in Rubber Industry - **Yanxi Zhang**, Netzsch Instruments North America, LLC
- 3:15 p.m. Plant Based Sustainable Alternatives to Silane for Enhanced Dynamic-Mechanical Properties of Rubber-Silica Compositions - **Partheban Manoharan**, Indian Institute Technology-Kharagpur, India





- 3:45 p.m. Break
- 4:00 p.m. Rubber Friction and Tire Traction on Ice Surfaces: Physical Background and Predictive Testing -
G. Heinrich, Leibniz Institute of Polymer Research Dresden, Germany
- 4:30 p.m. **Dr. Shogo Sumitani**, Asahi Kasei Corporation - Design and Characterization of Functionalized
S-SBR for Eco-tires with Low Rolling Resistance and High Wear Resistance

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- Intermediate to Advanced Compounding and Testing of Rubber** – May 9-12, 2017; Akron, OH
- Essentials of Rubber Technology** – May 9, 2017; Novi, MI
- Silicone Rubber Chemistry and Technology** – May 9, 2017; Novi, MI
- Compound Mixing and Consistency** – May 10, 2017; Novi, MI
- Establishing a Rubber Molding Process** – May 10, 2017; Novi, MI
- Applied Rubber Technology** – May 11 & 12, 2017; Novi, MI
- Understanding Raw Materials, the Building Blocks of Rubber Compounding** – May 16, 2017; Cerritos, CA
- Compounding for Performance** – May 17 & 18, 2017; Cerritos, CA
- Solving Problems in Rubber Compounding and Processing** – May 19, 2017; Cerritos, CA
- Chemistry & Technology of Polyurethane Elastomers** – May 23, 2017; Akron, OH
- Failure Analysis of Rubber & Plastics by Physical and Chemical Analysis** – May 24, 2017; Akron, OH
- Introduction to Compounding and Testing of Elastomers** – September 12, 2017; Akron, OH
- Internal Mixers and Mixing Parameters** – September 13, 2017; Akron, OH
- Molding of Rubber** – September 14, 2017; Akron, OH
- Introduction to Rubber Bonding** – September 15, 2017; Akron, OH
- Design of Experiments** – September 27 & 28, 2017; Akron, OH

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