



77th STLE Annual Meeting & Exhibition **May 21-25, 2023**

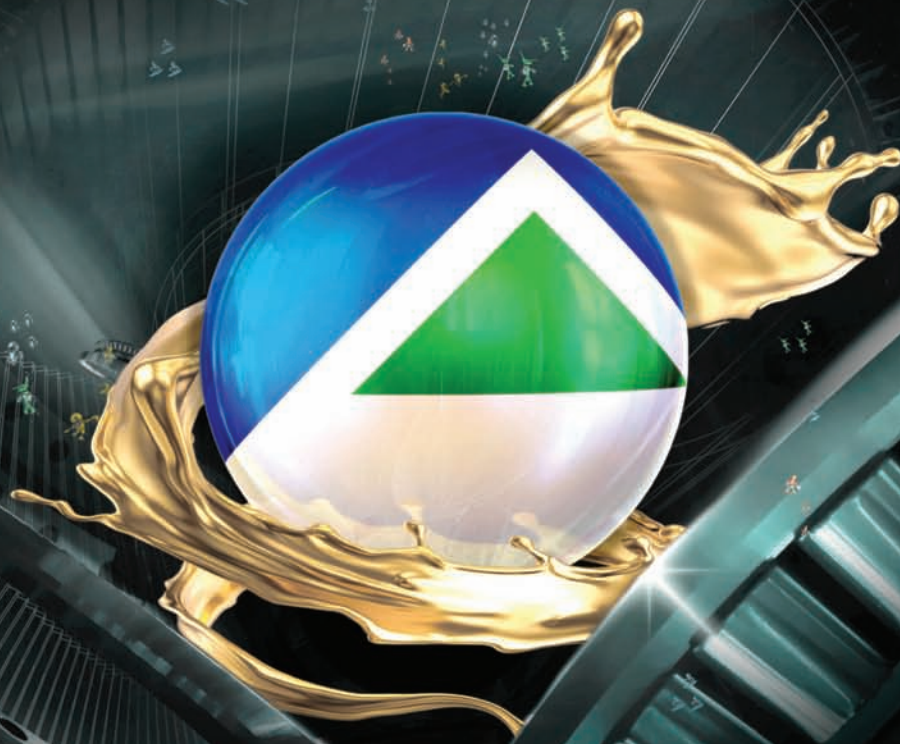
Long Beach Convention Center | Long Beach, California (USA)

Program Guide and Schedule

- Technical Sessions
- Exhibitors
- Education Courses
- Commercial Marketing Forum
- Student Poster Competition
- Keynote Session – “Hydrogen is Here: Are You Ready?”
- Special Events
- Networking Opportunities



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TAILORED TO HANDLE TODAY'S TOUGHEST CHALLENGES!

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The 2023 STLE Annual Meeting & Exhibition is sponsored by the Society of Tribologists and Lubrication Engineers, an international organization headquartered at 840 Busse Highway, Park Ridge, Illinois (USA) 60068-2376. Telephone: (847) 825-5536. Fax: (847) 825-1456. Email: information@stle.org. Web: www.stle.org. **STLE is a not-for-profit professional society founded in 1944 to advance the science of tribology and best practices in lubrication engineering.**

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Message from the President

Hello STLE Members, Friends and Guests,

We're glad to gather the STLE community again for our **77th Annual Meeting & Exhibition** in sunny California!

Two key STLE committees, the **Annual Meeting Program Committee** and the **Education Committee** should be applauded for their efforts in putting together a fantastic technical program featuring more than **500 paper presentations**. You can look forward to an outstanding week of professional development here in Long Beach, which is quickly becoming a popular convention and tourist destination with its scenic views of the Pacific Ocean and stunning beaches, restaurants and other notable attractions. All Annual Meeting events are conveniently located in the Long Beach Convention Center.

In addition to the technical sessions, the meeting features **11 one-day education courses** (offered on Sunday, Wednesday and Thursday) and the popular **Commercial Marketing Forum**, where the lubricant industry's most innovative companies discuss their latest products and services.

Don't forget to check out the **trade show** and visit with nearly 120 companies displaying the newest technologies, products and services. The exhibit hall is completely sold out, as this is an opportunity to engage with the industry's leading companies that are looking to do business with you. Also, you are invited to attend the **Exhibitor Appreciation Hour**, with two hours of dedicated exhibit time on Monday and Tuesday (3:00 pm – 4:00 pm). Refreshments will be served, and the trade show is the only annual meeting activity conducted at that time.

Remember, too, to take advantage of the social events, including the **Networking Reception** Monday evening at 6:30 pm and the **President's Luncheon** at 12:00 pm on Tuesday afternoon. Come connect with the entire STLE community, as we recognize this year's award recipients and the society's top volunteers who generously have donated their time and services to create new programs for all of us involved in the science of tribology and the practice of lubrication engineering.

To help navigate your investment and time here in Long Beach, please use this convenient **Program Guide** to help you prepare in advance and also make sure to download the free STLE Mobile App (available for iOS and Android devices). The app will have the most up to date annual meeting information throughout the week.

Additionally, all Annual Meeting attendees can also purchase the digital proceedings of the technical presentations that will be available after the meeting for a reduced fee, so you can catch up on any presentations you might have missed or would like to revisit again. For more information, visit **www.stle.org/AMproceedings**.

As you'll see on the following pages, STLE's 2023 Annual Meeting & Exhibition offers an unparalleled opportunity to discover technical concepts and make personal contacts that will help you save money for your organization and better serve your customers.

Lastly, if you are not already an STLE member, I would like to personally invite you to consider joining the leading technical organization for lubrication professionals. You'll soon find our membership cuts across a wide range of technical backgrounds and industries representing all segments of the tribology and lubrication field, who strongly embrace STLE's commitment to diversity and inclusion.

Have a wonderful week in Long Beach and enjoy the conference!

Ryan



Ryan Evans, Ph.D.
2022-2023 STLE President
The Timken Company

2023 STLE Annual Meeting Program schedule at a glance



Sunday, May 21

Registration

6:30 am – 5:00 pm – **Convention Center Foyer**

Education Course Speakers Breakfast

7:00 am – 7:45 am – **Grand Ballroom**

Education Courses* (8:00 am – 5:00 pm)

- Advanced Lubrication 301: Advanced Additives – **104B**
- Basic Lubrication 101 – **102C**
- Gears 101 – **102B**
- Hydraulics 201: Hydraulic Fluids and Systems Overview – **101A**
- Metalworking Fluids 130: Metal Treatment Chemical – **101B**
- Sustainability: Biolubricants and Biofuels (**New!**) – **104A**
- Synthetics: Basics & Applications (**New!**) – **102A**

Refreshment Break

10:00 am – 10:30 am – **Foyer**

STLE New Member & Student Networking Reception

6:30 pm – 8:00 pm – **Bogarts & Co.**

Monday, May 22

Registration

6:30 am – 6:00 pm – **Convention Center Foyer**

Speakers Breakfast

7:00 am – 8:00 am – **Grand Ballroom**

Technical Sessions (8:00 am – 10:00 am)

- 1A • Lubrication Fundamentals I: Forecasting Trends – **101A**
- 1B • Rolling Element Bearings I – **101B**
- 1C • Sustainable Power Generation I – **102A**
- 1D • Materials Tribology I – **102B**
- 1E • Condition Monitoring I – **102C**
- 1G • Nonferrous Metals I – **103B**
- 1H • Commercial Marketing Forum I – **103C**
- 1I • Electric Vehicles I – **104A**
- 1K • Metalworking Fluids I – **201A**
- 1M • Herbert S. Cheng Memorial Symposium: Challenges in Lubrication and Tribology Modeling I – **202A**
- 1N • Nanotribology I – **202B**
- 1O • AI and Machine Learning I – **202C**

2023 STLE Annual Meeting

Program schedule at a glance

Monday, May 22 | continued

Refreshment Break

10:00 am – 10:30 am – **Grand Ballroom Foyer**



Opening General Session (10:30 am – 12:00 pm)

Keynote Address – **Grand Ballroom 1/2**

- **“Hydrogen is Here: Are You Ready?”**
Speaker: Angel Wileman, Manager, Thermofluids,
Southwest Research Institute (SwRI)

Lunch (on your own) – 12:00 pm – 1:30 pm

Commercial Exhibits and Student Posters

12:00 pm – 5:00 pm – **Hall B**

Technical Sessions (1:30 pm – 6:00 pm)

- 2A • Lubrication Fundamentals II: Marine Engines – **101A**
- 2B • Rolling Element Bearings II – **101B**
- 2C • Wind Turbine Tribology I – **102A**
- 2D • Materials Tribology II – **102B**
- 2E • Condition Monitoring II – **102C**
- 2F • Environmentally Friendly Fluids I – **103A**
- 2G • Nonferrous Metals II – **103B**
- 2H • Commercial Marketing Forum II – **103C**
- 2I • Electric Vehicles II – **104A**
- 2K • Metalworking Fluids II – **201A**
- 2M • Herbert S. Cheng Memorial Symposium: Challenges in
Lubrication and Tribology Modeling II – **202A**
- 2N • Nanotribology II – **202B**
- 2O • AI and Machine Learning II – **202C**

Exhibitor Appreciation Break

3:00 pm – 4:00 pm – **Hall B**

Networking Reception

6:30 pm – 8:00 pm – **Hyatt Hotel**

Tuesday, May 23

Registration

6:30 am – 5:00 pm – **Convention Center Foyer**

Speakers Breakfast

7:00 am – 8:00 am – **Grand Ballroom**

Commercial Exhibits and Student Posters

9:30 am – 12:00 pm & 2:00 pm – 5:30 pm – **Hall B**

Refreshment Break

10:00 am – 10:30 am – **Hall B**

Technical Sessions (8:00 am – 12:00 pm)

- 3A • Lubrication Fundamentals III: Friction Modifiers – **101A**
- 3B • Rolling Element Bearings III – **101B**
- 3C • Fluid Film Bearings I – **102A**
- 3D • Materials Tribology III – **102B**
- 3E • Condition Monitoring III – **102C**
- 3F • Environmentally Friendly Fluids II – **103A**
- 3G • Gears I – **103B**
- 3H • Commercial Marketing Forum III – **103C**
- 3I • Electric Vehicles III – **104A**
- 3K • Metalworking Fluids III – **201A**
- 3N • Nanotribology III – **202B**

President’s Luncheon/Business Meeting

12:00 pm – 2:00 pm – **Grand Ballroom**

Technical Sessions (2:00 pm – 6:00 pm)

- 4A • Lubrication Fundamentals IV: Polymers – **101A**
- 4B • Rolling Element Bearings IV – **101B**
- 4C • Fluid Film Bearings II – **102A**
- 4D • Materials Tribology IV – **102B**
- 4F • Environmentally Friendly Fluids III – **103A**
- 4G • Gears II – **103B**
- 4H • Commercial Marketing Forum IV – **103C**
- 4I • Electric Vehicles IV – **104A**
- 4K • Metalworking Fluids IV – **201A**
- 4L • Tribochemistry I – **201B**
- 4N • Nanotribology IV – **202B**

Exhibitor Appreciation Break

3:00 pm – 4:00 pm – **Hall B**

Ideation Event: Roundtable Discussions

4:00 pm – 6:00 pm – **Grand Ballroom 1/3**

2023 STLE Annual Meeting

Program schedule at a glance

Wednesday, May 24

Registration

6:30 am – 5:00 pm – **Convention Center Foyer**

Speakers Breakfast

7:00 am – 8:00 am – **Grand Ballroom**

Commercial Exhibits and Student Posters

9:30 am – 12:00 pm – **Hall B**

Refreshment Break

10:00 am – 10:30 am – **Hall B**

Education Courses* (8:00 am – 5:00 pm)

- Advanced Lubrication 302: Advanced Lubrication Regimes – **Regency DEFH (Hyatt Hotel)**
- Basic Lubrication 102 – **Regency A (Hyatt Hotel)**
- Metalworking Fluids 250: Understanding and Controlling Metal Removal – **Regency BC (Hyatt Hotel)**

Technical Sessions (8:00 am – 12:00 pm)

- 5A • Lubrication Fundamentals V: Wear and Engines – **101A**
- 5B • Rolling Element Bearings V – **101B**
- 5D • Materials Tribology V – **102B**
- 5E • Tribochemistry II – **102C**
- 5F • Contact Mechanics I – **103A**
- 5G • Tribotesting I – **103B**
- 5H • Commercial Marketing Forum V – **103C**
- 5I • Electric Vehicles V – **104A**
- 5L • Surface Engineering I – **201B**
- 5M • Grease I – **202A**
- 5N • Nanotribology V – **202B**

Lunch (on your own) – 12:00 pm – 1:30 pm

Technical Sessions (1:30 pm – 6:00 pm)

- 6A • Lubrication Fundamentals VI: Innovative Test Methods – **101A**
- 6B • Rolling Element Bearings VI – **101B**
- 6C • Synthetic Lubricants and Hydraulics I – **102A**
- 6D • Materials Tribology VI – **102B**
- 6E • Tribochemistry III – **102C**
- 6F • Contact Mechanics II – **103A**
- 6G • Tribotesting II – **103B**
- 6H • Commercial Marketing Forum VI – **103C**
- 6I • Electric Vehicles VI – **104A**
- 6K • Tribology of Biomaterials I – **201A**
- 6L • Surface Engineering II – **201B**

Technical Sessions | continued

6M • Grease II – **202A**

6N • Wear I – **202B**

Refreshment Break

3:00 pm – 3:30 pm – **Foyer**

Thursday, May 25

Registration

6:30 am – 12:00 pm – **Convention Center Foyer**

Speakers Breakfast

7:00 am – 8:00 am – **Grand Ballroom**

Education Courses* (8:00 am – 5:00 pm)

- Electric Vehicles – **104A-B**

Technical Sessions (8:00 am – 12:00 pm)

- 7A • Lubrication Fundamentals VII: Nanoparticles and Coatings – **101A**
- 7C • Seals I – **102A**
- 7E • Tribochemistry IV – **102C**
- 7F • Biotribology I – **103A**
- 7G • Tribotesting III – **103B**
- 7H • Commercial Marketing Forum VII – **103C**
- 7I • Electric Vehicles VII – **104A**
- 7J • Metalworking Fluids V – **201A**
- 7K • Surface Engineering III – **201B**
- 7L • Grease III – **202A**
- 7M • Wear II – **202B**

Refreshment Break

10:00 am – 10:30 am – **Foyer**

Lunch (on your own) – 12:00 pm – 1:30 pm

Technical Sessions (1:30 pm – 6:00 pm)

- 8C • Seals II – **102A**
- 8F • Biotribology II – **103A**
- 8G • Tribotesting IV – **103B**
- 8I • Electric Vehicles and Engine and Drivetrain VIII – **104A**
- 8L • Grease IV – **202A**
- 8M • Wear III – **202B**

Refreshment Break

3:00 pm – 3:30 pm – **Foyer**

2023 STLE Annual Meeting

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Monday, May 22

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Ideation Event: Roundtable Discussions

(4:00 pm – 6:00 pm)



2023 STLE Annual Meeting

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Technical Sessions (1:30 pm – 6:00 pm)

6A • Lubrication Fundamentals VI: Innovative Test Methods	123
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Education courses index

Education Courses* – (8:00 am to 5:00 pm)

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• Basic Lubrication 101	18
• Gears 101	19
• Hydraulics 201: Hydraulic Fluids and Systems Overview.....	19
• Metalworking Fluids 130: Metal Treatment Chemical	19
• Sustainability: Biolubricants and Biofuels (New!)	20
• Synthetics: Basics & Applications (New!).....	20

Wednesday, May 24

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• Basic Lubrication 102	21
• Metalworking Fluids 250: Understanding and Controlling Metal Removal.....	21

Thursday, May 25

• Electric Vehicles	21
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*Rooms subject to change.

2023 STLE Annual Meeting

Business meetings schedule

Technical Committees

Monday, May 22

Session 2G • Room 103B

Nonferrous Metals (4:30 pm – 5:30 pm)

Session 2E • Room 102C

Condition Monitoring (5:30 pm – 6:00 pm)

NEW!

Session 2C • Room 102A

Sustainable Power Generation (5:30 pm – 6:00 pm)

Session 2C • Room 102A

Wind Turbine Tribology (5:30 pm – 6:00 pm)

Tuesday, May 23

Session 4G • Room 103B

Gears (4:00 pm – 4:30 pm)

Session 4F • Room 103A

Environmentally Friendly Fluids (5:00 pm – 5:30 pm)

Session 4N • Room 202B

Nanotribology (5:00 pm – 6:00 pm)

Session 4C • Room 102A

Fluid Film Bearings (5:30 pm – 6:00 pm)

Session 4A • Room 101A

Lubrication Fundamentals (5:30 pm – 6:00 pm)

Session 4K • Room 201A

Metalworking Fluids (6:00 pm – 6:30 pm)

Session 4B • Room 101B

Rolling Element Bearings (6:00 pm – 6:30 pm)

Wednesday, May 24

Session 6M • Room 202A

Grease (4:30 pm – 5:30 pm)

Session 6L • Room 201B

Surface Engineering (5:00 pm – 5:30 pm)

Session 6N • Room 202B

Wear (5:00 pm – 5:30 pm)

Session 6D • Room 102B

Materials Tribology (5:00 pm – 5:30 pm)

Session 6K • Room 201A

Biotribology (5:30 pm – 6:00 pm)

Session 6G • Room 103B

Tribotesting (5:30 pm – 6:00 pm)

Session 6F • Room 103A

Contact Mechanics (6:00 pm – 6:30 pm)

Session 6I • Room 104A

Electric Vehicles/Engine & Drivetrain (6:00 pm – 6:30 pm)

Session 6C • Room 102A

Synthetic Lubricants & Hydraulics (6:00 pm – 6:30 pm)

Thursday, May 25

Session 8C • Room 102A

Seals (5:00 pm – 5:30 pm)



Meetings held in the
Long Beach Convention
Center.



Annual meeting exhibitors

The exhibition is located in the Long Beach Convention Center – Hall B.

Company Name	Booth #	Company Name	Booth #	Company Name	Booth #
Acme-Hardesty Company	411/413	Ergon, Inc.	216/218	PCC Rokita	615
ADEKA USA Corporation	717	Evonik Oil Additives USA, Inc.	205	PCS Instruments	515/517/519
Advanced Chemical Concepts Inc.	227	ExxonMobil Chemical Company	211	PerkinElmer	125
Agilent Technologies	810	Falex Corporation	714	Phoenix Tribology Ltd.	230
Amee Castor & Derivatives Ltd.	617	FedChem/Federal Process	421	Pilot Chemical Company	422
American Petroleum Institute	715	Formulation	423	Ravago Chemicals North America	111
American Refining Group	814	Functional Products, Inc.	623	Rianlon Americas, Inc.	721
AnalytiChem	818	Gehring-Montgomery, Inc.	625/627	Richful Lube Additive Co., Ltd.	303
Analytik Jena US	630	GELITA	720	Rtec Instruments	620/622
Anhui Trust Chem Co., Ltd.	322	Huntsman	516	Sanyo Chemical	430
Applied Rigaku Technologies	531	IMCD US	417/419	Sasol Chemicals	524/526
Ayalytical Instruments	323/325	Indorama	530	Savant Labs	520
Barentz North America, LLC	618	Industrial Quimica Lasem S.A.U.	324/326	Sea-Land Chemical Company	221
Baron USA, LLC	719	Ingevity	431	SI Group	731
BASF	316/318	INEOS Oligomers	510/512	Soltex, Inc.	222
Biosynthetic Technologies	521	Italmatch Chemicals	311/313	Solvay USA	716
Bruker	119/121	Kao Chemicals Europe, S.L.U.	223	SONGWON International – Americas Inc.	225
BYK USA	631	KH Neochem Americas, Inc.	619	TAMU-MEEN	824
Cannon Instrument Company	127	King Industries, Inc.	217/219	Tannas Company & King Refrigeration	522
Cargill	730	Koehler Instrument Company, Inc.	410/412	The Lubrizol Corporation	317/319
Carpenter Company	331	Korea Institute of Science and Technology (KIST)	822	Tulstar Products, Inc.	722
ChemCeed	713	LANXESS Corporation	511/513	Turbomachinery Laboratory	812
Chevron Phillips Chemical Company	320	LGC Standards	826	UniSource-Energy, LLC	723
Clariant	624/626	LSI Chemical	621	United Soybean Board	131
Colonial Chemical Inc.	224/226	Lubricant Expo	830	Univar Solutions	416/418
Compass Instruments	710/712	Münzing	220	Vanderbilt Chemicals, LLC	117
DataPhysics Instruments USA	820	Napoleon Engineering Services	123	VBase Oil Company	726
DC Scientific	725/727	Nouryon	711	Wincom, Inc.	724
DL Chemical	816	Oil Filtration Systems	616	Zschimmer & Schwarz	611
Dover Chemical Corporation	327	Optimol Instruments Pruftechnik GmbH	420		
Dow	523	ORG Chem Group	709		
Eastman Chemical Company	610	Palmer Holland Inc.	231/330		
Elé Corporation	321	PCC Chemax, Inc.	613		
Elemental Scientific	718				
Emery Oleochemicals	424/426				
ENEOS USA, Inc.	612/614				

The above exhibitors are displaying the lubricant industry's latest products, services and technologies at the 2023 STLE Annual Meeting & Exhibition. This list is complete as of April 25, 2023.

Annual Meeting Trade Show Floor Plan

709
ORG CHEM
Group

810 Agilent Tech.	812 Turbo- machinery Lab.	814 American Refining Group	816 DL Chemical	818 Analyti- Chem	820 Data- Physics Instr.	822 KIST	824 TAMU- MEEN	826 LGC Standards	830 Lube Expo
Nouryon 711	ChemCeed 713	American Petroleum Inst. 715	Adeka USA 717	Baron USA 719	Rianlon Americas 721	UniSource -Energy 723	DC Scientific 725 / 727		SI Group 731



Long Beach Convention
Center Exhibit Hall

Exhibition hours:

Monday, May 22

(12:00 pm – 5:00 pm)

Exhibitor Appreciation Hour

(3:00 pm – 4:00 pm)

Evonik Raffle (3:30 pm) – Must
be present to win. (Booth #205)

Tuesday, May 23

(9:30 am – 12:00 pm) &

(2:00 pm – 5:30 pm)

Wednesday, May 24

(9:30 am – 12:00 pm)

710 / 712 Compass Instruments	714 Falex Corp.	716 Solvay USA	718 Elemental Scientific	720 Gelita	722 Tulstar Products	724 Wincom	726 VBase Oil Co.	730 Cargill
Zschimmer & Schwarz 611	PCC-Chemax, Inc./ PCC Rokita 613 / 615	Amee Castor & Derivatives 617	KH Neochem Americas 619	LSI Chemical 621	Funtional Products 623	Gehring- Montgomery 625 / 627		BYK USA 631

610 Eastman	612 / 614 ENEOS, USA	616 Oil Filtration Systems	618 Barentz North America	620 / 622 Rtec-Instruments	624 / 626 Clariant	630 Analytik Jena
LANXESS Corporation 511 / 513	PCS Instruments 515 / 517 / 519			Bio- synthetic Tech. 521	Dow 523	Applied Rigaku Tech. 531

510 / 512 INEOS Oligomers	516 Huntsman	518 Teknor Apex Co.	520 Savant Labs	522 Tannas Co. & King Refrig.	524 / 526 Sasol Chemicals	530 Indorama
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Richful
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Annual meeting sponsors

STLE wishes to thank the following sponsors for their generous support of the 77th STLE Annual Meeting & Exhibition. Visit www.stle.org/annualmeeting for the most up-to-date list of additional sponsors and onsite signage in Long Beach. This list is complete as of April 25, 2023.

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General information and policies

The exhibition is located in the Long Beach Convention Center – Hall B. (See map on page 9)

Exhibition Hours

- **Monday, May 22** (12:00 pm – 5:00 pm)
Exhibitor Appreciation Hour (3:00 pm – 4:00 pm)
 Evonik Raffle (3:30 pm) – Must be present to win. (Booth #205)
- **Tuesday, May 23** (9:30 am – 12:00 pm) & (2:00 pm – 5:30 pm)
 Closed for President’s Luncheon (12:00 pm – 2:00 pm)
Exhibitor Appreciation Hour (3:00 pm – 4:00 pm)
 Evonik Raffle (3:30 pm) – Must be present to win. (Booth #205)
- **Wednesday, May 24** (9:30 am – 12:00 pm)

Registration Information

Annual Meeting registration entitles you to attend the technical sessions, trade show (Monday through Wednesday), Networking Reception on Monday evening, President’s Luncheon on Tuesday afternoon and most other sanctioned annual meeting events.

President’s Luncheon guest tickets are \$50 – free to STLE Corporate Members (**two tickets**) and students – and can be purchased at the STLE registration desk in the Promenade Lobby of the Long Beach Convention Center.

Attendance at business meetings of technical committees and industry councils is open to anyone who is registered for the meeting. See condensed schedule (page 8) for time and location of individual technical committee and industry council meetings.

Registration Hours

- Saturday, May 20** (12:00 pm – 6:00 pm)
- Sunday, May 21** (6:30 am – 5:00 pm)
- Monday, May 22** (6:30 am – 6:00 pm)
- Tuesday, May 23** (6:30 am – 5:00 pm)
- Wednesday, May 24** (6:30 am – 5:00 pm)
- Thursday, May 25** (6:30 am – 12:00 pm)

Annual Meeting & Education Course Policies

- All attendees must be registered.
- All attendees receive a badge with their registration materials. The badge must be worn at all times and is required for admittance to any technical session, education course and the trade show.
- Badges may not be exchanged. Attendees who loan their badges to others will have their badges confiscated and their annual meeting privileges rescinded.
- Annual Meeting registration includes admittance to the trade show, technical sessions, Commercial Marketing Forum and all social events, including the Monday evening Networking Reception and Tuesday afternoon President’s Luncheon.
- Distributing handouts at technical sessions is not permitted. Handouts will be given to education course attendees.
- Disseminating material or conducting business in the exhibit hall is not permitted if you are not an official exhibitor.

Recording Policy

Audio or video recording is not permitted in any of the annual meeting technical sessions or Commercial Marketing Forum presentations. Audio recording is permitted in the education courses with advance permission of the instructor. No video of any kind is permitted.

Photo Policy

STLE’s official photographer will take photos of select technical sessions, Commercial Marketing Forum presentations, social events and the trade show on Monday and Tuesday. These photos will be used in print materials promoting the 2024 STLE Annual Meeting & Exhibition in Minneapolis, Minnesota (USA). If you do not wish to have your photograph taken and published, please step out of the photo frame or notify the photographer afterwards if your photo has been taken so the image can be deleted.



STLE Mobile App – Download Today!

Program updates will be posted daily in the Annual Meeting section of the STLE Mobile App (under the Events section). The STLE Mobile App is available for Apple and Android devices.



Apple iOS



Android

Annual Meeting section sponsored by Palmer Holland.



Cellular Phone Policy

In order to not disturb speakers or fellow attendees, please keep cellular telephones on vibrate and leave the room to talk.

Dress Code

Business casual dress is appropriate for STLE events at the annual meeting. Technical session and education course speakers often choose attire that is more formal on the day of their presentations.

Harassment Policy

STLE is committed to providing an atmosphere that encourages the free expression and exchange of scientific ideas. As part of that commitment, STLE is dedicated to promoting a safe and welcoming environment for all participants attending the STLE Annual Meeting & Exhibition. All participants are expected to abide by this policy in all venues at the STLE Annual Meeting, including ancillary events and official and unofficial social gatherings. Harassment of any kind is strictly prohibited, and the Society will not tolerate acts in violation of this policy.

Any individual who believes that he or she has been the subject of, or has witnessed, harassment should immediately report the incident to STLE staff. All reports are confidential. A copy of the full policy is available at www.stle.org.

Statement on Diversity and Inclusion

STLE welcomes and encourages participation by all individuals regardless of age, culture, ethnicity, gender identity or expression, national origin, physical or mental difference, politics, race, religion, sex, sexual orientation, socio-economic status, or subculture. We strive to cultivate a society built on mentorship, encouragement, tolerance, and mutual respect, thereby engendering a welcoming environment for all.

Future Industry Meeting Dates

STLE Tribology Frontiers Conference
(co-located with STLE Tribology & Lubrication for E-Mobility Conference)
Cleveland Marriott Downtown at Key Tower
November 12-14, 2023
Cleveland, Ohio (USA)

STLE Tribology & Lubrication for E-Mobility Conference
(co-located with STLE Tribology Frontiers Conference)
Cleveland Marriott Downtown at Key Tower
November 14-15, 2023
Cleveland, Ohio (USA)

78th STLE Annual Meeting & Exhibition
Minneapolis Convention Center
May 19-23, 2024
Minneapolis, Minnesota (USA)

79th STLE Annual Meeting & Exhibition
Hyatt Regency Hotel
May 18-22, 2025
Atlanta, Georgia (USA)

80th STLE Annual Meeting & Exhibition
Hyatt Regency New Orleans
May 17-21, 2026
New Orleans, Louisiana (USA)

Get social with us!

Stay up to date on the latest annual meeting announcements and connect with fellow attendees using the conference hashtag **#STLE2023** on your favorite social media sites.

 LinkedIn | www.linkedin.com

 Twitter | [Twitter.com/STLE_Tribology](https://twitter.com/STLE_Tribology)

 Facebook | [Facebook.com/stle.org](https://facebook.com/stle.org)

 Instagram | [Instagram.com/STLE_Tribology](https://instagram.com/STLE_Tribology)



2023 STLE Annual Meeting Special Events

All annual meeting events are in the Long Beach Convention Center.

New Member & Student Networking Reception

Sunday, May 21

6:00 pm – 8:00 pm | Bogart & Co.

This year's New Member and Student Networking Reception will be held at Bogart & Co., located in the Convention Center.

Come join other new STLE members and students for an evening of networking and great food, as well as build friendships and expand your professional connections.

This event is for new members and students only!



Opening General Session

Monday, May 22

10:30 am – 12:00 pm | Grand Ballroom 1/2

STLE honors its esteemed journal publishing award recipients during the Monday General Session program. You'll also hear a keynote presentation from Angel Wileman, Manager, Thermofluids, with Southwest Research Institute, titled **"Hydrogen is Here: Are You Ready?"**



Tribology STEM Camp

Monday, May 22

9:30 am – 12:00 pm | Hall B

During STLE's 2023 Annual Meeting, the Society is hosting area high school students for its 7th Annual Tribology STEM Camp. Students will have the opportunity to see demonstrations and participate in hands-on experiments, led by engineers and scientists from the STLE community, to learn about areas of research within the fields of tribology and lubrication engineering. STLE's goal is to expose students interested in STEM (science, technology, engineering and mathematics) to careers in tribology and lubrication engineering.

Networking Reception

Monday, May 22

6:30 pm – 8:00 pm | Hyatt Hotel

This is the annual meeting's central networking event and a way for you to reconnect with old friends while making new ones. Since people come to STLE's Annual Meeting & Exhibition from around the world, this truly is an international event. Relax, socialize and add to your list of professional contacts through this outstanding networking event.

Exhibitor Appreciation Hour

Back by popular demand, two hours of dedicated exhibit time will occur at this year's show:

Monday, May 22 & Tuesday, May 23

3:00 pm – 4:00 pm | Hall B

Refreshments will be served in the trade show. Technical sessions, education courses, Commercial Marketing Forum presentations and all other annual meeting activities will cease at this time. Come support the meeting's exhibitors – and find solutions to your most pressing technical issues.

President's Luncheon & 77th STLE Annual Meeting Business Meeting

Tuesday, May 23

12:00 pm – 2:00 pm | Grand Ballroom



Ryan Evans

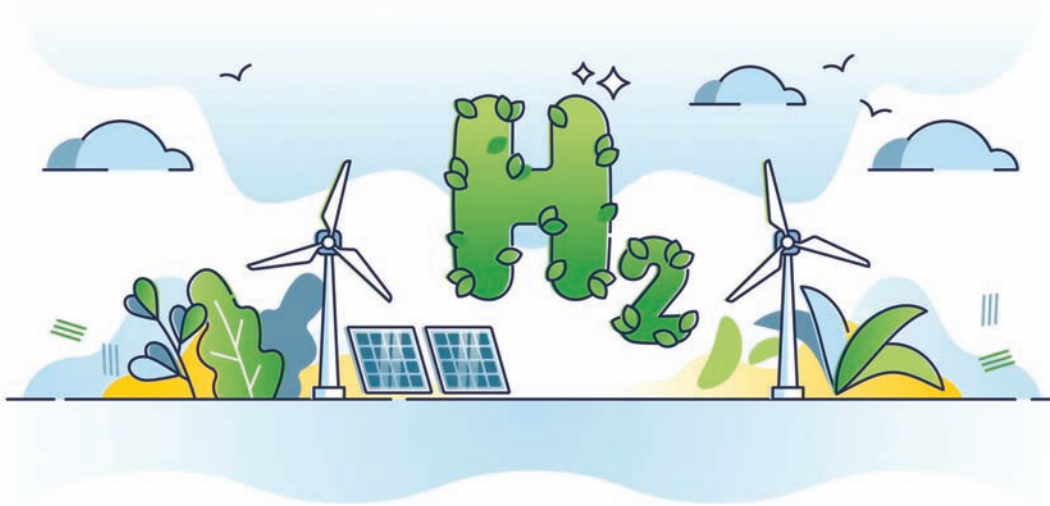


Hong Liang

Ticketed Event – The annual meeting's major business function draws virtually all attendees for a two-hour event honoring STLE's incoming and outgoing presidents, award winners and top volunteers. Come honor 2022-2023 President Ryan Evans with The Timken Company and 2023-2024 President Hong Liang with Texas A&M University.

Tickets to the luncheon are included with annual meeting registration and free to STLE Corporate Member representatives (two tickets) and students. Additional tickets may be purchased for \$50 per person at the STLE Registration Desk in the Convention Center Foyer.

2023 STLE Annual Meeting
Opening general session
Hydrogen is Here: Are You Ready?



Monday, May 22

Keynote Address (10:30 am – 12:00 pm)

Long Beach Convention Center | Grand Ballroom 1/2

Keynote Speaker: Angel Wileman

Manager, Thermofluids, Southwest Research Institute (SwRI)

Sponsored By



Hydrogen has been “nearly” here for a long time but has never fully come to fruition due to the significant technical challenges with its production, storage, and use. However, hydrogen holds promise as a viable energy solution for global decarbonization. Hydrogen can be used as a tool to create electric power, heat our homes, and fuel our vehicles, without fear of contributing to climate change and its dangerous effect on human health and ecosystems. With the world’s focused drive to become carbon neutral, industry has shifted back toward hydrogen as an energy solution. The time is now for making the leap from possibility to reality, but is society ready? Do we have sufficient solutions to the technical challenges that are introduced by using hydrogen as a global energy source?

The daunting list of technical challenges associated with global acceptance of hydrogen fuel starts with the high cost of production. Despite hydrogen being the most abundant element in the world, the current cost of hydrogen production is high, and significant work must be completed to make it an economically feasible option. Further, hydrogen has a small particle size and low density at ambient conditions, complicating material selection, component design, and storage options. Additionally, hydrogen is highly reactive and has a fast flame speed, which necessitates significant technological advancements prior to industry-wide use of hydrogen combustion engines.

In this keynote talk, we will investigate the wide variety of challenges facing hydrogen technology developers and give

examples of research studies that are ongoing to address these challenges, making hydrogen a viable fuel that can play an important part in our sustainable future. The development of cost-effective and efficient hydrogen production technologies will be discussed, as well as the challenges associated with the storage, transportation, and use of hydrogen. The current U.S. and worldwide regulations around hydrogen will also be discussed, providing a peek into our hydrogen-fueled future.

Listen to the podcast: *Decarbonizing Hydrogen with Angel Wileman*, at: www.swri.org/podcast/ep42 to learn more.



Angel Wileman leads the Hydrogen Collaboration Initiative at Southwest Research Institute (SwRI), bringing together cross-functional teams to solve the world’s toughest hydrogen technology challenges. Hailing from the University of Texas at Austin, where she obtained a master’s degree in mechanical engineering, Angel has spent her career

researching fluid effects on flow components and complex fluids processes for the energy industry. Having worked in several positions including academia and semiconductor manufacturing, Angel began her career at SwRI in 2011 and became manager of the Thermofluids Engineering Section in 2018. Angel was honored with the San Antonio Business Journal “40 under 40” Award in 2023 and the Empowering Women in Industry “Leadership in STEM” Award in 2019.



2023 STLE Education Courses & Instructors

Please note all education courses are in the Long Beach Convention Center with the exception of Wednesday courses that are to be held in the Hyatt Regency Hotel.

The **2023 STLE Annual Meeting & Exhibition** features 11 industry-specific education courses offered on Sunday, May 21, Wednesday, May 24, and Thursday, May 25. The schedule is designed to give attendees more flexibility when planning their conference attendance. All courses are full day (start at 8:00 am and end by 5:00 pm). If you have not signed up for a course but would like to, please go to the STLE Registration Desk in the Promenade Lobby of the Long Beach Convention Center to check on availability. **Individuals will not be admitted to a course without registration.**

Sunday, May 21

Advanced Lubrication 301: Advanced Additives | 104B

Course Chair: Farrukh Qureshi, The Lubrizol Corporation

Advanced Lubrication 301 covers the molecular structures and chemistries of lubricant additive types. Additives examined will include antioxidants, rust inhibitors, detergents, dispersants, antiwear additives, extreme pressure additives, friction modifiers and rheology and viscosity modifiers.

Modules and Instructors:

- **Antioxidants & Rust Inhibitors**, Kevin DeSantis, BASF
- **Detergents & Dispersants**, Allison Williamson, The Lubrizol Corporation
- **Antiwear, Extreme Pressure & Friction Modifiers**, Eugene Scanlon, BASF
- **Rheology & Viscosity Modifiers**, Christopher Kabb, The Lubrizol Corporation

Who should attend: Engineers and scientists early/mid-career who want to brush up on their knowledge of lubricant additives.

Basic Lubrication 101 | 102C

Course Chair: Yvette Trzcinski, HF Sinclair

Basic Lubrication 101 is primarily for individuals entering the lubrication field who need a broad introduction to the field of lubrication, lubrication principles and lubricating materials. This course is also for individuals not directly involved but who need a broad overview of lubricants and basic lubricating components. This course does not require a formal scientific degree or background, although many technical terms and concepts are covered. Experienced industry professionals attend the course to be kept up to date on the latest developments, especially in those areas not directly related to their job function or area of expertise.

Modules and Instructors:

- **Lubrication Fundamentals**, Jake Finn, HF Sinclair
- **Base Oil Fundamentals**, Yvette Trzcinski, HF Sinclair
- **Additives**, Chris Schmid, The Lubrizol Corporation
- **Synthetics**, Tom Malinski, Chevron Phillips Chemical Company
- **Fundamentals of Grease**, David Turner, CITGO Petroleum Corporation
- **Lubricant Tests**, Raymond Drost, Calumet Specialty Products Partners, L.P.

Who should attend: Lubricant Sales Personnel, Additive Sales, Lubricant/Additive Marketing, Lubricant Formulator or Manufacturer, Academia, Base Stock Sales or Manufacturer, Original Equipment Manufacturer (OEM), Testing Equipment Manufacturer, Lubricant-Governing Associations.



Gears 101 | 102B

Course Chair: Larry Ludwig, Schaeffer Manufacturing Company

Gears 101 is designed to provide a general understanding of industrial gearing. This course will serve as a guide to establish not only a basic knowledge of gears and their supporting components but also their lubrication. In this course, you will learn about gear functions and types, basic gear terminology, the different types of industrial gear lubricants, the factors that affect gear lubrication, industrial gear lubricant requirements and their proper selection, open gear lubrication, gear wear modes, gear failure analysis and condition monitoring.

Modules and Instructors:

- **Gear Functions and Types**, Frank Uherek, Regal Rexnord
- **Gear Terminology**, Frank Uherek, Regal Rexnord
- **Gear Ratings**, Frank Uherek, Regal Rexnord
- **Gear Manufacturing**, Richard Butler, New Age Chemical
- **Gear Drive Components**, Frank Uherek, Regal Rexnord
- **Gear Failure Analysis – Modes, Effects and Patterns**, Frank Uherek, Regal Rexnord
- **Gear Failure Analysis – Root Cause Analysis**, Larry Ludwig, Schaeffer Manufacturing Company
- **Types of Industrial Gear Lubricants and Factors Affecting Their Lubrication**, Mike Holloway, 5th Order Industry
- **Industrial Gear Oil Requirements**, Mike Holloway, 5th Order Industry
- **Selection of Industrial Gear Lubricants**, Mike Holloway, 5th Order Industry
- **Gear Condition Monitoring**, Larry Ludwig, Schaeffer Manufacturing Company

Who should attend: Students, Lubricant Formulators, End-Users of Gear Lubricants, and anyone interested in knowing more about industrial gearing and their lubrication.

Hydraulics 201: Hydraulic Fluids and Systems Overview | 101A

Course Chair: Nathan Knotts, Chevron

This course provides an overview of the basic mechanical components used in hydraulic fluid power transmission. The composition and performance of hydraulic fluids will be discussed. The course will also feature sections on maintenance and troubleshooting as they pertain to hydraulic systems and in-service fluid analysis.

Modules and Instructors:

- **Hydraulic Fluids & System Overview**, Nathan Knotts, Chevron
- **Fluids Composition & Testing**, Nathan Knotts, Chevron



- **Fluid Degradation & Field Studies**, Scott Howard, Hy-Pro Filtration Corporation
- **Sustainability & Energy Efficiency**, Shubhamita Basu, The Lubrizol Corporation

Who should attend: Lubricant Sales Personnel, Additive Sales, Lubricant/Additive Marketing, Lubricant Formulator or Manufacturer, Academia, Base Stock Sales or Manufacturer, Original Equipment Manufacturer (OEM), Testing Equipment Manufacturer, Lubricant-Governing Associations.

Metalworking Fluids 130: Metal Treatment Chemical | 101B

Course Chair: Jennifer Lunn

While processing parts using metalworking fluids, there is a need for treating, cleaning, and protecting chemical and/or coatings. Substrates either are immersed in these chemicals or have them applied during some point of the processing. This course covers heat treating including oil and polymer quenching, cleaning parts and protecting parts from rust and corrosion. Individuals learn the basics of metallurgy as it applies to heat treating and quenching.

Modules and Instructors:

- **Metal Treating Fluids (Part I)**, John Duggan, DuBois Chemicals, Inc.
- **Metal Treating Fluids (Part II)**, John Duggan, DuBois Chemicals, Inc.
- **Metal Cleaning Fluid Chemistry**, Neil Canter, Chemical Solutions
- **Parts Cleaning Fundamentals – Importance of Cleaning and Rinsing**, Suresh Patel, BASF
- **Paint Pretreatments**, Suresh Patel, BASF
- **Metal Protecting (Part I)**, Ben Faber, The Lubrizol Corporation
- **Metal Protecting (Part II)**, Ben Faber, The Lubrizol Corporation
- **Metal Protecting Dry Films**, Richard Butler, New Age Chemical, Inc.

Who should attend: Chemists, Engineers, Technical Support Staff and Field Service Technicians working with and using metalworking fluids.

Education Courses & Instructors *(continued)*

(NEW!)

Sustainability: Biolubricants and Biofuels | 104A

Course Chair: Brajendra K. Sharma, USDA

This course will be an overview of current progress in the development and use of biofuels and biolubricants. The course elements will include an introduction to energy and alternative fuels, basic chemistry of biofuels and biolubes, general performance requirements, overviews of market progress, niche markets, sustainability, and governmental and regulatory drivers. Products currently in various stages of commercialization will be discussed. Information on European, U.S. and OEM views will be included. The course will primarily focus on biolubricants but will include a general overview of alternative transportation fuels. Biofuel feedstocks, production and quality issues will also be covered. An outstanding list of speakers with first-hand knowledge in these areas will teach the course.

Modules and Instructors:

- **Introduction to Biofuels and Biolubricants**, Brajendra K. Sharma, USDA
- **Chemistry 101 – Petroleum and Biobased Lubricants**, Selim Erhan, Process Oils Inc.
- **Chemistry 101 – Petroleum and Biobased Fuels**, Dan Garbark, Battelle
- **Biofuel & Biolubricant Developments and Markets in the EU**, Stephan Baumgaertel, VSI – German Lubricant Manufacturers Association
- **Growth of “Niche” Markets in the US**, Larry Beaver, RSC Chemical Solutions
- **General Performance Requirements of Lubricants**, Mark Miller, Alliant Ventures
- **Biodegradation, Regulations and Standards**, Neil Canter, Chemical Solutions
- **USDA Biolubricant Programs**, Selim Erhan, Process Oils Inc.
- **Biofuels and Other Alternative Transportation Fuels**, Dan Garbark, Battelle
- **Biofuel Markets and OEM Concerns**, Alex Kulinowski, Afton Chemical Corporation
- **Sustainable Cooperation in the Lubricant Industry – A Transformation Towards a Circular and Sustainable Lubricant Value Chain**, Inga Herrmann, VSI – German Lubricant Manufacturers Association

Who should attend: Students, Engineers, Scientists, Lubricant Formulators, Users early/mid-career.

(NEW!)

Synthetics: Basics & Applications | 102A

Course Chair: Vasu Bala, Tiarco LLC

Designed primarily for formulators and users of lubricating materials, this course provides an overview of non-petroleum-based lubricants, their comparison to each other and to petroleum oil. It provides an introduction to synthetic lubricant basestocks and applications, as well as compares the use of

these synthetic lubricants to petroleum-based products and between types of synthetic lubricants.

Modules and Instructors:

- **Introduction to Lubricant Classification**, Dennis Bachelder, American Petroleum Institute
- **Esters**, Gene Zehler, BASF
- **Polyglycols & Silicones**, Lauren Huffman, Dow Chemical Corporation
- **Polyalphaolefins**, Tom Malinski, Chevron Phillips Chemical Company
- **Alkylated Aromatics**, Najeeb Kuzhiyil, ExxonMobil Chemical
- **Phosphate Esters**, Salvatore Rea, LANXESS Solutions US
- **Food Processing Applications**, Tyler Housel, Zschimmer & Schwarz
- **Industrial Compressor Applications**, Glenn Short, BVA Inc.
- **Transportation Driveline Applications**, Donna Mosher, BASF
- **Gear Applications**, Larry Ludwig, Schaeffer Manufacturing Company
- **Wind Turbine Applications**, Philip Ma, BASF
- **Fire Resistant Fluids**, Salvatore Rea, LANXESS Solutions US
- **Synthetic Biolubricants**, Selim Erhan, Process Oils Inc.

Who should attend: Students, Engineers, Scientists, Lubricant Formulators, Users early/mid-career.

Wednesday, May 24

Advanced Lubrication 302: Advanced Lubrication Regimes | Regency DEFH (Hyatt Hotel)

Course Chair: Weixue Tian, ExxonMobil

Advanced Lubrication 302 goes more in-depth on lubrication regimes, wear, and wear mechanisms, as well as lubricant failure analysis. This course includes a series of lubricant failure analysis case studies on automotive engines, gears, and bearings.

Modules and Instructors:

- **Lubrication Regimes**, Brendan Miller, Chevron
- **Wear & Wear Mechanisms**, Ramoun Mourhatch, Chevron
- **Lubricant Failure**, Weixue Tian, ExxonMobil
- **Failure Analysis: Automotive Engines**, Hamed Ghaednia, Gehring L.P.
- **Failure Analysis: Gears**, Stephen Berkebile, US Army Research Laboratory
- **Failure Analysis: Bearings**, Daniel Merk, Schaeffler Technologies AG

Who should attend: Lubricant Sales Personnel, Additive Sales, Lubricant/Additive Marketing, Lubricant Formulator or Manufacturer, Academia, Base Stock Sales or Manufacturer, Original Equipment Manufacturer (OEM), Testing Equipment Manufacturer, Lubricant-Governing Associations.

Basic Lubrication 102 | Regency A (Hyatt Hotel)

Course Chair: Yvette Trzcinski, HF Sinclair

Basic Lubrication 102 is an overview of equipment systems (gears, bearings, seals, compressors, and engines) and their lubrication requirements, including a module on grease. Like Basic Lubrication 101, this course does not require a formal scientific degree or background, although many technical terms and concepts related to the use of lubricants in various mechanical devices are covered. This course is intended for a diverse group, including individuals involved in technical service, sales, marketing, manufacturing, maintenance, and managers who want to know more about how lubricants work in service. This course assumes fundamental knowledge of lubricants and lubrication principles, as presented in the Basic Lubrication 101 course.

Modules and Instructors:

- **Gear Fundamentals**, Frank Uherek, Regal Rexnord
- **Fundamentals of Hydraulics**, Nathan Knotts, Chevron
- **Seals**, Gareth Fish, The Lubrizol Corporation
- **Compressors**, Joe Schultz, The Lubrizol Corporation
- **Bearings & Lubrication Systems**, Paul Shiller, First Power Group
- **Gasoline & Diesel Engines**, Jake Finn, HF Sinclair

Who should attend: Lubricant Sales Personnel, Additive Sales, Lubricant/Additive Marketing, Lubricant Formulator or Manufacturer, Academia, Base Stock Sales or Manufacturer, Original Equipment Manufacturer (OEM), Testing Equipment Manufacturer, Lubricant-Governing Associations.

Metalworking Fluids 250: Understanding and Controlling Metal Removal | Regency BC (Hyatt Hotel)

Course Chair: Kevin Saunderson, BP

Once a metalworking fluid has been qualified for use in an application, its performance depends on successful fluid management. In turn, successful fluids management depends on a fundamental understanding of the factors that work against fluid life and fluid performance, as well as cost-effective strategies for preventing these factors from causing metal-working fluid failure. Metalworking Fluids 250 is designed to meet both of these needs. It covers primary failure mechanisms, including the effect of contaminant particle size, water quality, microbes and oil contamination. Also presented are recommendations on how best to prevent each of these factors from destroying metalworking fluid performance and shortening metalworking fluid functional life.

Modules and Instructors:

- **Metal Worked and Particle Size Considerations**, John Burke, Consultant
- **Filtration**, Craig Thomas, J.R. Schneider Company
- **Water Quality**, Bridget Dubbert, Engineered Lubricants Company
- **Extraneous Oils, Contamination Effects & Control Practices**, John Burke, Consultant

- **Microbial Concerns & Controls**, Fred Passman, BCA, Inc.
- **Foam Issues & Concerns**, Michael Staples, Kao Chemicals GmbH
- **Corrosion Causes, Concerns & Controls**, Neil Canter, Chemical Solutions
- **Compatibility Concerns**, Bill Downs, DuBois Chemicals, Inc.
- **Root Cause Analysis**, Fred Passman, BCA, Inc.

Who should attend: Plant Managers, Shop Supervisors, Chemical Management Personnel, Technical Sales and Marketing Personnel, Health & Safety or Environmental Affairs Personnel, Maintenance Personnel, Waste Treatment Personnel, Coolant Compounder – Technical Service and Laboratory Personnel, Chemical Process Operators, Individuals new to metalworking technology.



Thursday, May 25

Electric Vehicles | 104A-B

Course Chair: Carlos Sanchez, Southwest Research Institute

This course introduces hardware, tribology, lubrication, thermal management, and testing related to EV. It includes an overview of hybrid, fully battery and fuel-cell electric vehicles and covers the driveline systems of hybrid and full electric units. Other topics covered include lubricant, tribology and thermal management challenges and requirements for EVs and concludes with discussion about established test methods for EV fluid evaluation.

Modules and Instructors:

- **An Overview of Hybrid Full Electric and Fuel Cell Vehicles**, Peter Lee, Southwest Research Institute
- **Hardware Design and Drive Unit**, Peter Lee, Southwest Research Institute
- **Lubricant Requirements for Electric Vehicles**, Chris Cleveland & Lisa Thalen, Afton Chemical Corporation
- **Lubricating Greases for Electric Vehicle Applications**, Gareth Fish, The Lubrizol Corporation
- **Heat Transfer and Thermal Management in HEV and EV**, Thomas Wellmann, FEV North America
- **Test Methods for Evaluation of Electric Vehicle Fluids**, Rebecca Warden, Chevron Oronite
- **eTribology: Experimental Methods for Evaluating EV Fluids and Materials**, Harpal Singh, Consultant

Who should attend: Lubricant Manufacturers, Raw Material Suppliers, Distributors, End-users of Lubricants, Senior Corporate Management, Technical Sales and Marketing Personnel Formulators, Engineers & Chemists, Plant Managers, Research & Product Developers.



Award recipients

STLE would like to congratulate the following individuals who will be recognized for their outstanding technical achievements in the field of tribology and lubrication during the 2023 STLE Annual Meeting & Exhibition, in Long Beach, California.

Publishing awards are given in recognition of outstanding achievement in the field of tribology and lubrication. All awards are for papers printed in **Tribology Transactions**, STLE's peer-reviewed journal.

Edmond E. Bisson Award

The Bisson Award was named in honor of Edmond E. Bisson, a former STLE editor-in-chief who was instrumental in establishing the society's reputation as a technical publisher. Established in 1991, the award is given to STLE members or non-members for the best written contribution published by the society in the year preceding the Annual Meeting. The contribution must deal with tribology, lubrication engineering or allied disciplines.

- **Arman Mohammad Khan**, Northwestern University (USA)
- **Q. Jane Wang**, FSTLE, Northwestern University (USA)
- **Juan Esteban Fernandez**, Azul 3D, Inc. (USA)
- **Zhe Li**, General Motors Corporation (USA)
- **Yuchuan Liu**, General Motors Corporation (USA)

"Friction at Ring-Liner Interface Analyzed with a Systematic Surface Characterization"

Frank P. Bussick Award

The Bussick Award is presented for the most outstanding technical paper written on sealing systems technology and materials. The award is sponsored by the STLE Seals Technical Committee and honors a former committee chair and STLE board member.

- **Abdolkarim Sheikhsari**, The University of Sheffield (United Kingdom)
- **Jonathan Knapton**, Dawn Aerospace (United Kingdom)
- **Diego Benito**, Rolls-Royce plc (United Kingdom)
- **Ben Shaw**, Rolls-Royce plc (United Kingdom)

- **Ehsan Alborzi**, The University of Sheffield (United Kingdom)
- **Simon Blakey**, University of Birmingham (United Kingdom)

"Development of an Apparatus for Testing of High-Temperature Static Seals"

Walter D. Hodson Award

The Hodson Award was established in 1950 and is given to the lead author of the best paper written by an STLE member 35 years of age or younger and published by the society in the year preceding the Annual Meeting. The purpose of the award is to stimulate the interest of young engineers in the science of tribology and lubrication and the activities of STLE.

- **Rami Kerrouche** (*lead author), National Research Council (Canada)
- **Azzedine Dadouche**, National Research Council (Canada)
- **Mahmoud Mamou**, National Research Council (Canada)
- **Salah Boukraa**, University of Blida (Algeria)

"Power Loss Estimation and Thermal Analysis of an Aero-Engine Cylindrical Roller Bearing"

Wilbur Deutsch Memorial Award

The Deutsch Award is named for a former STLE president and recognizes the most outstanding technical paper written on the practical aspects of lubrication published by the society in the year preceding the Annual Meeting.

- **Robert Jan Meijer**, University of Twente (The Netherlands)
- **Piet M. Lugt**, University of Twente/SKF Engineering & Research Centre B.V. (The Netherlands)

"The Grease Worker and its Applicability to Study Mechanical Aging of Lubricating Greases for Rolling Bearings"

Captain Alfred E. Hunt Award

Named for ALCOA's first president, this award is given annually to the STLE member or members authoring the best technical paper dealing with the field of lubrication or an allied field.

- **Thomas Russell**, Purdue University (USA)
- **Farshid Sadeghi**, FSTLE, Purdue University (USA)
- **Wyatt Peterson**, Purdue University (USA)
- **Saeed Aamer**, Purdue University (USA)
- **Ujjawal Arya**, Purdue University (USA)

"A Novel Test Rig for the Investigation of Ball Bearing Cage Friction"

Al Sonntag Award

The Sonntag Award was established in 1983 and is given to an STLE member or members authoring the best technical paper on solid lubricants published by the society in the year preceding the Annual Meeting.

- **Sujan K. Ghosh**, University of Arkansas at Little Rock (USA)
- **Nathaniel Harris**, University of Arkansas (USA)
- **Neda Mahmoudi**, SurfTec, LLC (USA)
- **Dipankar Choudhury**, Dexcom (USA)
- **Josue A. Goss**, University of Arkansas (USA)
- **Samuel Beckford**, SurfTec, LLC (USA)
- **Min Zou**, FSTLE, University of Arkansas (USA)

"Improving the Tribological Performances of PDA + PTFE Nanocomposite Coatings by Hot Compaction"

(continued on page 24)



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Industry Service Awards Recipients

STLE International Award



Dr. Ewa Bardasz,
FSTLE, ZUAL Associates in
Lubrication (USA)

The International Award, which was established in 1948, is STLE's highest technical honor and bestows lifetime honorary membership on the recipient, who need not have been a member of STLE. It is given in recognition of the recipient's outstanding contributions in tribology, lubrication engineering or allied fields.

P.M. Ku Meritorious Award



Greg Croce,
CLS, Chevron Products
Company (USA)



Paul Hetherington,
CLS, HF Sinclair (retired)
(USA)

The Ku Award was established in 1978 and is given to the STLE member who most typifies the dedicated spirit of the late P.M. Ku, who worked tirelessly to promote and advance the mission of STLE. The award has been established to recognize outstanding and selfless achievement on behalf of STLE. To qualify for the honor, the recipient must have been a member of the society for at least 15 consecutive years and performed extensive active, dedicated service.

Vic Joll Award



Dr. William Tuszynski,
The Unami Group, STLE
Philadelphia Section (USA)

The Vic Joll Award recognizes outstanding and selfless contributions by a member of an STLE local section. It is given to a section member who has worked tirelessly and continuously for the benefit of the section, devoting numerous hours in the performance of many tasks necessary to promote and advance the mission of the section and of STLE. The award is named in honor of the late Vic Joll, 1978-79 STLE president who championed local sections.

Raymond L. Thibault Excellence in Education Award



Ruediger Krethe,
CLS, OilDoc GmbH
(Germany)

The Raymond L. Thibault
Excellence in Education

Award was established in 2020 and is given to an STLE member who has demonstrated dedication to passionate and influential work as an educator in practical aspects of tribology and lubrication engineering which benefits the STLE community.

2023 STLE Fellows

STLE Fellows are persons of outstanding personal achievement in the field of tribology or lubrication engineering who have 20 years of active practice in the science and/or engineering professions and have been an STLE member for 10 years. Individuals are nominated by the Fellows Committee and approved by the STLE board of directors.



Dr. Hong Gao, FSTLE,
Shell Global Solutions (US)
Inc. (USA)



Dr. Ken Hope, FSTLE, CLS,
Chevron Phillips Chemical
Company (USA)



Dr. Peter Lee, FSTLE,
Southwest Research
Institute (USA)



**Dr. Shuangbiao (Jordan)
Liu,** FSTLE, Northwestern
University (USA)



Dr. Steve Shaffer, FSTLE,
Shaffer Tribology Consulting
(USA)

Outstanding STLE Local Section Awards

- STLE Houston Section
- STLE Philadelphia Section

Student Scholarships

Presidential Awards Program

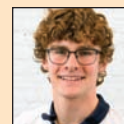
STLE grants three academic awards through its Presidential Awards Program: The Elmer E. Klaus Fellowship (graduate students), The E. Richard Booser Scholarship (undergraduate students) and The Jeanie S. Scholarship (female undergraduate or graduate students). These awards are administered by the STLE Presidential Council and are meant to encourage students to pursue an advanced degree or a career in tribology or lubrication engineering by subsidizing a research project related to the field.



**The Elmer E. Klaus
Fellowship:
Seokhoon Jang,** Penn
State University (USA)



Nicolas Molina Vergara,
The University of Texas at
Austin (USA)



**The E. Richard Booser
Scholarship:
Jackson Swets,** Gonzaga
University (USA)



**The Jeanie S. McCoy
Scholarship: Allison Chau,**
University of California,
Santa Barbara (USA)

Early Career Awards

This award recognizes the technical achievements of STLE student members, postdoctoral researchers, junior-level academic faculty & industry professionals and provides financial support for attendance to the STLE Annual Meeting.



**Student
Allison Chau,** University of
California, Santa Barbara
(USA)



**Postdoctoral Researcher
Dr. Pranjal Nautiyal,**
University of Pennsylvania
(USA)



**Academic Professional
Dr. Prathima Nalam,**
University at Buffalo (USA)



**Industry Professional
Dr. Mao Ueda,** Shell
Lubricants Japan (Japan)