28th Annual Anodizing Conference & Exposition

Anodizing for Design and Function: Targeting the Right Application

October 1–3, 2019
Royal Sonesta Galleria • Houston, Texas • USA

Take Advantage of 2019 Focus & General Session Highlights

Take part in three extensive tracks with four extended top level sessions that run concurrently and are filled with all the tools and know-how to help advance your company and career to the next level!

Maximize your learning experience by sending team members to participate and share these track sessions with the rest of your company!

Focus & General Sessions • Anodizing EXPO

Anodizing Workshops (Level 1 & Level 2) • Networking and more
Schedule at a Glance

Monday, September 30
7:30 a.m. – 5:00 p.m.  Committee & Board of Directors Meetings
8:30 a.m. – 5:00 p.m.  Anodizing Essentials Workshop (Level 1)

Tuesday, October 1
7:30 a.m. – 6:30 p.m.  Registration Open
8:30 a.m. – 3:45 p.m.  Anodizing Quality & Troubleshooting Workshop (Level 2)
9:40 a.m. – 3:00 p.m.  Space Center Houston Tour (additional registration)
4:30 p.m. – 5:30 p.m.  New Member Reception (by invitation only)
5:30 p.m. – 7:30 p.m.  Welcome Reception & Anodizing Expo Open with Student Posters

Wednesday, October 2
7:00 a.m. – 8:00 a.m.  Breakfast & Anodizing Expo Open with Student Posters
7:30 a.m. – 5:00 p.m.  Registration Open
8:00 a.m. – 11:55 a.m.  Anodizing Conference Opening General Session
Noon – 1:00 p.m.  Lunch & Anodizing Expo Open with Student Papers
1:10 p.m. – 5:00 p.m.  FOCUS SESSION TRACK
• Architectural
• Anodizing for Design & Function
• Technical
5:00 p.m. – 6:30 p.m.  Reception & Anodizing Expo Open

Thursday, October 3
7:30 a.m. – 8:30 a.m.  Breakfast & Anodizing Expo Open
8:30 a.m. – Noon  Anodizing Conference GENERAL SESSION
12:15 p.m. – 1:00 p.m.  Post Conference Critique Meeting
1:00 p.m. – 2:00 p.m.  Education Committee Meeting
**Space Center Houston Tour**

**Tuesday, October 1**  [A Value-Added Option]

**9:40 a.m. – 3:00 p.m.**  **Bus departs hotel at 8:45 a.m.**

$125.00 per person includes transportation, private tour and meal voucher

The non-profit space museum Space Center Houston is the Official Visitor Center of NASA Johnson Space Center, which is home to Mission Control and astronaut training. At Space Center Houston, visitors can experience space — from its compelling future to its exciting present and dramatic past.

Space Center Houston is one of the only places on Earth where visitors can see astronauts train for missions, touch a real moon rock and take a behind-the-scenes tour of NASA. Visitors can go inside the unprecedented international landmark Independence Plaza, the only exhibit in the world with a full-scale shuttle replica mounted on top of the original shuttle carrier aircraft NASA 905 and standing eight stories tall. The exhibits, attractions and hands-on activities in this 250,000-square-foot educational entertainment complex tell the story of America's human space flight program, giving guests an experience like no other.

Your day will start with a 90-minute guided Tram Tour of NASA to see Historic Mission Control, an astronaut training facility and Rocket Park, including the iconic Saturn V rocket. You will then enjoy a 60-minute personal tour of Space Center Houston and discover the intriguing details of flown spacecraft on display and learn of the innovations NASA is making today to achieve the feats of tomorrow.

*You will have time after the tour concludes for lunch in Zero-G Diner, and more exploring. Bus returns back to the hotel at 3:00 p.m.*

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**Hotel Reservations**

Make your room reservations with the hotel by calling: **1.855.463.3091**. AAC’s group room rate is **$179 (USD)**, single or double occupancy, plus tax. To receive this special rate, make your reservation over the phone or online **no later than September 9, 2019**. (5:00 p.m. CST)

Visit [www.AACconf.org](http://www.AACconf.org) for a link to the hotel reservations page featuring the special AAC discount room rates and room reservation cancellation policy information.

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**School for Anodizers**

AAC developed the School for Anodizers as an educational program for industry professionals to improve their operations and level of expertise. The following courses are offered as additional educational options during the Annual Anodizing Conference. **Additional fee and registration are required. Further program details can be found online at [AACconf.org](http://AACconf.org).**

**Anodizing Essentials Workshop – Level 1**

**Monday, September 30 • 8:30 a.m.– 5:00 p.m.**  [A Value-Added Option]

This one-day program for anodizers teaches the fundamentals and the foundation of quality anodizing. This basic course explains how to anodize aluminum properly and was developed by anodizing professionals for anodizing professionals.

With an emphasis on quality, the program takes the learner through the entire process – beginning with the metallurgical properties of aluminum alloys commonly anodized right through to the final rinse and sealing processes. This course is ideal for those who may be new to working the anodizing line, as well as those who oversee the process or who may simply want a refresher – a reminder of best practices.

*Registration for this course includes breakfast, lunch, and course materials. For more information, including complete schedule, session topics, and descriptions, visit [AACconf.org](http://AACconf.org).*

**Anodizing Quality & Troubleshooting Workshop – Level 2**

**Tuesday, October 1 • 8:30 a.m.– 3:45 p.m.**  [A Value-Added Option]

This advanced class moves beyond the anodizing basics to address quality and process issues commonly faced by anodizers. The first half of the workshop explains manufacturing processes and metal finishing, followed by how to recognize and troubleshoot anomalies that may manifest through the processes discussed. The second half of the workshop offers a series of interactive “Troubleshooting Stations” where process experts will host small groups to discuss various individual problems, building on the principles presented in the first half of the workshop.

*Feel free to bring in your own small pieces of anodized aluminum and questions and the group can help you troubleshoot a solution.*

*Registration for this course includes breakfast, lunch, welcome reception, and course materials.*

**Workshop Topics:**

- Anodizing Basics for Aluminum Surfaces
- Manufacturing Processes
- Effective Troubleshooting
- A Systems Approach to Quality Anodizing
- Breakout Tabletop Discussions of Anomalies (defects), their Causes & Cures
**The Program**

**Tuesday, October 1**

4:30 p.m. – 5:30 p.m.
**New Member Reception** – by invitation only

Join us at the New Member Reception as we welcome and introduce those who joined our organization during the last year. This is an excellent networking opportunity for everyone!

5:30 p.m. – 7:30 p.m.
**Welcome Reception and Anodizing Expo**

Whether you are looking to reconnect with friends and colleagues, or meet and mingle with new contacts, the Welcome Reception is the place to bridge your connections. Set amid the business-friendly Anodizing Expo, this provides a great opportunity to ask questions, get answers, and establish new contacts in the anodizing industry.

**Wednesday, October 2**

8:00 a.m. – 11:55 a.m.  **PLENARY Session**

AAC Chairman’s Welcome, AAC Annual Meeting and Business Report

**Todd Hamilton, Southern Aluminum Finishing**

8:40 a.m. – 9:25 a.m.
**Aluminum – The Versatile Metal of Art and Architecture – The Beauty of Anodized Aluminum Surfaces and Constraints Faced by the Design Community**

**L. William Zahner, Metalabs, LLC**

Aluminum’s versatile and predictable surface appearance makes it special among architectural metals. Its corrosion-resistant surface oxide film can be enhanced, enabling color introduction and durability. Aluminum is a lightweight structural material with a versatile skin, making it a designer’s metal of choice, yet the anodizing process is not understood. Constraints perceived by the design community are discussed. New and revived over dyeing techniques are described. The oxide layer’s benefits and behavioral characteristics are discussed, from an architectural and art perspective.

9:25 a.m. – 10:10 a.m.
**Shrinking the Pore Dimensions of Anodized Aluminum Oxide to the Molecular Scale**

**Kirk J. Ziegler, Dept. of Chemical Engineering, Univ. of Florida**

Anodized aluminum oxide (AAO) is used in nanoscale applications; its self-ordered porous structure can be tuned to specific diameter and packing density for nanoscale applications requiring high-density, smaller-diameter pores. Improved methods for maximizing porous structure surface area must also allow fabrication onto a desired substrate with optimized electrical contact. A self-ordering method produces sub-10-nanometer pores during anodization. Methods are examined for fabricating/transferring AAO/pores onto plastics, indium tin oxide, and silicon. Our work generating templates for photonics, cryogenic cooling and energy conversion is presented.

10:10 a.m. – 10:25 a.m. BREAK

10:25 a.m. – 11:10 a.m.
**Aluminum Design in High-End Car Audio**

**Mikkel Venge, Huemen**

Branded audio systems have become an important way to upgrade cars in the premium/luxury segment; aluminum is one of the preferred speaker grill materials. For 10+ years, I have explored Bang & Olufsen’s brand and aluminum competencies in an automotive context. How aluminum’s practical qualities and aesthetic characteristics go hand in hand to create valuable items is presented: material understanding and attention to detail showcased through various surface treatments, gloss levels and anodization finishes; industrial craftsmanship carried out in extruding, machining and forming of aluminum to fulfill the design intention. Prize-winning designs made possible through multidisciplinary teamwork are highlighted.

11:10 a.m. – 11:55 a.m.
**Recent Development in Aluminum Application for Lightweight Car Design**

**Jüergen Hirsch, Hydro Aluminum**

Aluminum for automobile applications and in lightweight design is clearly the best-suited material over high-strength steels. Recent research and development activities are presented in aluminum alloy variants like new non-heat-treatable 5xxx alloys and age-hardenable 6xxx and 7xxx alloy variants, with improved strength, formability, corrosion resistance, and surface appearance. Innovative processing technologies like hot-forming, including press hardening or additive manufacturing are addressed. The economic and ecological aspects outlined confirm aluminum’s important role and great future in modern lightweight car design for body-in-white, chassis, and structural and engine applications.

1:10 p.m. – 5:00 p.m.
**Focus Session Tracks** – See page 6 for details.

Three concurrent tracks featuring 12 extended topic-specific presentations help anodizing professionals enhance performance, improve practices, and gain new insights into anodizing procedures, processes, and information.

*AAC reserves the right to alter the schedule & substitute speakers as needed.*
Thursday, October 3

8:30 a.m. – Noon

GENERAL Session

8:30 a.m. – 9:15 a.m.
Update on the Aluminum Markets
Greg Whittbecker, CRU

CRU’s current views on primary aluminum supply and demand and the impact of scrap substitution are provided. CRU’s latest perspective and analysis on U.S. trade actions are presented, and how these actions are impacting broad segments of the supply chain.

9:15 a.m. – 10:00 a.m.
Producing Quality Aluminum Billet for Extrusion
Dave Salee, Wagstaff

Extruded aluminum products require high-quality raw material in order to deliver the highest quality product to the market. Understanding DC cast aluminum billet production leads to understanding the potential quality implications inherent to the DC casting process that may directly impact the extrusion process, and downstream processing such as anodizing, forging, ring rolling, etc. Reviewing the aluminum source and various processing steps that deliver billet to extruders provides a more complete understanding of issues affecting extruded product quality. This allows extruders to be more selective and empowers them to evaluate potential billet suppliers to achieve premium quality extrusion products.

10:00 a.m. – 10:15 a.m.
BREAK

10:15 a.m. – 11:00 a.m.
The Current Global Market for Organic Dyes and Implications for Anodizers
Chris Ebbrecht, GetColored, Inc.

Organic dyes have been used to color anodic films for over 75 years. The global marketplace and shifting global markets have changed this landscape. There are more quality suppliers of organic dyes with their products available on a global basis. The amount of quality organic colorants is growing. Concurrently, the environmental pressures in countries worldwide have also increased. There has been similar pressure on the intermediate chemistry used to manufacture these organic colorants. U.S.-imposed tariffs have shifted interest in sourcing dyes and colorants from several countries. These changes and their implications for the anodizer using organic dyes are presented.

11:00 a.m. – 11:45 a.m.
Keeping Your Safety Message Alive!
Kelly Miller, Bonnell Aluminum

Necessary...Yes, Easy...No, Boring...Can be. Join me for some creative ways to get your safety message to be heard and remembered.

Thank You Conference Sponsors
The AAC Council wishes to thank the following member companies for their sponsorship.**

** Due to the limited space in this brochure, session descriptions and abstracts are abbreviated. For complete information and program details, please visit AACconf.org.
### Architectural

**A History of Anodizing**  
Richard W. Mahn,  
Richard Mahn Technical Services, LLC

Of all the known industrial metals, aluminum has the shortest history - less than 150 years as a commercially available metal, and less than 100 years as a finishable metal. This presentation will recount some highlights of aluminum’s anodizing history.

### Anodizing for Design and Function

**Anodizing Voltage vs. Current Density**  
George Oh and Nathan Sheffield,  
Houghton Metal Finishing

Changes in current density and voltage over the course of anodizing affect the anodized aluminum pore microstructure, albeit in different ways. In this study, we compare anodization while holding current density constant vs. holding voltage constant, and evaluate the effects on benchmark parameters such as coating thickness, coating weight, and ADTs, as well as their effects on other steps in the process such as coloring.

**Three Reasons for Using Pulse Anodizing**  
Anne Deacon Juhl,  
AluConsult

The pulse anodizing process has been used for many years now. There continues to be many issues and prejudices about this subject. Universities and industry are still interested in figuring out whether or not this advanced approach towards a very mature process works or not. Therefore, this presentation explains why pulse anodizing should be introduced into your existing or new anodizing line. Three main reasons for utilizing pulse anodizing are examined: 1) Easier to reach a uniform and decorative layer on alloyed aluminum, for example, recycled; 2) Decreased energy consumption; and 3) Increased productivity.

**Beyond Aluminum; Anodization of Transition Metals**  
Wojciech J. Stepienski,  
Lehigh University

Anodization of aluminum provides hexagonally-arranged nanoporous morphology of amorphous alumina. Research is presented on anodization of Ti, Zr, Cu, and alloys including TiAl and FeAl intermetallic. Anodization of Ti allows obtaining of nanotubular or nanoporous morphology of amorphous titania, beneficial as implant material, photocatalyst, and a key element in dye-sensitized solar cells. Anodization of copper allows obtaining of nanowires and nanoneedles, composed of crystalline Cu, O, and CuO.

### Technical

**Cosmetic and Functional Hard Coat**  
Tej Patel,  
Techdevon LLC

This presentation discusses the types of hard coat anodizing, modified and conventional, and how each can be used for functional benefits for anodized applications. We will also discuss the ability to enhance the cosmetic appeal of hard coat anodizing and what techniques/factors should be considered, as follows: alloy type; coating density/porosity; coating thickness; dye selection; lightfastness/weatherfastness; and the sealing process. An overview is presented of the various industry applications where both functional and cosmetic requirements are needed, as it relates to hard coat anodizing.

**The Systemic Resolution of Bright Dip Problems**  
Melvin Todd,  
Fang Phos, Inc.

The primary theme of this presentation is to identify typical problems encountered in the bright dip process. Strategies that may be employed to resolve difficulties such as pitting, transfer etch, grainy metal, and others are discussed. The role that extrusion practices and the aluminum microstructure play in generating bright dip defects are considered. The bright dip bath chemistry is also examined as a potential source of numerous metal finishing problems. These defects will be discussed in detail.

**Using Spectrometers for Color Analysis on Anodized Aluminum**  
Sara Merrick-Albano,  
Covit America

Color spectrometers are a powerful tool used in the paint and print industry, but what happens when this technology is applied to anodized aluminum? With variations from alloy, finish, and dye, anodized aluminum presents a challenge to spectrometers that can be overcome when the limitations and variables are understood. As cosmetic anodizers, we have successfully used spectrometers for color matching, color analysis, and in-process quality control, and these experiences will be discussed.

**Pulse Chemistry Procedures for Maximum Efficiency and TQI**  
Fred Schaedel,  
Alpha Plus Systems Affiliate of Alpha Process

Actual anodic pulse chemistry procedures are presented for commercial and aerospace anodizing. This electrochemical pulse technology provides maximized efficiency along with total quality improvement. The advantages of pulse chemistry are discussed in the following situations: 1) when anodizing difficult alloys; 2) where masking and cathodes are critical issues; and 3) how data logger graphs are used in actual production runs, including aircraft landing gears and helicopter rotor blades.

**Practical and Effective Test Methods for Managing Organic Dye Baths in Anodizing Job Shops**  
Chris Ebbrecht,  
GetColored, Inc.

Anodizing shops rely on supplier information about their organic dye tanks, often requiring lab testing and corrective action. This process causes delays, reduced efficiency and increased turnaround time. Effective dye bath test methods are presented and visual test methods for quick solution management. Test methods with minimal equipment investment are provided. Strategies for approaching a troubled organic dye bath are outlined. Anodizing shops are able to make real-time decisions and use education to effectively manage their own chemistry.
REGISTRATION FORM

Please print clearly. One registrant per form. Photocopy this form for each additional registrant. Only those registered may attend Anodizing Conference Functions. Registration includes: program sessions, take-home materials, scheduled receptions, meals and break refreshments based on Conference or Workshop registration.

Last Name ___________________________ First Name ___________________________

Preferred Name for Badge ___________________________

Company ___________________________ Job Title ___________________________

Company Address ___________________________

Number of Employees in all locations ___________________________

(Regardless of Country) Phone ___________________________ Fax ___________________________

Email ___________________________

☐ Check here if you have a disability and require accommodation to fully participate. AAC will contact you.

REGISTRATION FEES

(Please copy this form and complete top portion for each attendee.)

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Add-On Options

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☐ Essentials Workshop Level 1 ONLY (add-on) $400 $400 $800 $800 $800 $800

☐ Quality & Troubleshooting Workshop Level 2 ONLY (add-on) $400 $400 $800 $800 $800 $800

☐ Space Center Houston Tour $125 $125 $125 $125 $125 $125

GRAND TOTAL = $ ___________________________

Send Completed Registration Forms and Payment to:
1000 N. Rand Road, Suite 214
Wauconda, Illinois 60084-3102 USA
Tel: 847.526.2010
Fax: 847.526.3993

SECURE FAX: fax with credit card information to 847.526.3993

NOTE: For your protection, please do not email form with credit card information. Please fax or mail completed form to the Aluminum Anodizing Council (AAC).

Cancellation policy:
Registration fees will be refunded only if written notice is received on or before September 13, 2019. A 20% administrative fee will be deducted from the refund.

Substitutions may be made at any time without penalty.

PAYMENT

Payment must accompany registration form; registration is not complete until payment is received.

☐ Check enclosed for $____________________

Make check payable in U.S. dollars, drawn on a U.S. bank, to the Aluminum Anodizers Council.

or Credit Card: ☐ Visa ☐ MasterCard ☐ AmEx ☐ Discover

Printed name of cardholder ____________________________________________ Signature ___________________________

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