EDU'18 Extrusion Design University
May 14 – 16, 2018
Chicago Marriott O'Hare

Register by March 9th to Save $50

Expand your knowledge and understanding of Aluminum Extrusion!

Education • Expo • Add-on Workshops • Networking & more!
Join us for Extrusion Design University – EDU ‘18, a two-day event that features educational presentations and an Expo focused on expanding aluminum extrusion knowledge.

Since 2011, the Aluminum Extruders Council has been educating the design, build and engineering community about the advantages of working with aluminum extrusions.

This event connects industry experts who understand extrusion design and production processes with designers, engineers, and specifiers who are interested in enhancing their knowledge and understanding of aluminum extrusions. **EDU ‘18 is designed to educate, accelerate professional growth and facilitate relationships.**

Thousands of professionals have participated in learning events that have garnered averaged quality and substance scores of 4.5 and higher out of 5 stars!

This is your opportunity to hear the best of the best when it comes to AEC education. Like many of our recent offerings, these classes will be CEU approved and eligible for professional development hours (PDH).

From alloys and applications to paint and fabrication, the program provides a wealth of aluminum extrusion information and resources.

Visit AEC.org/EDU18 for details as they become available.

**Take advantage of this extraordinary opportunity!**

- **Learn from more than a dozen expert speakers** from aluminum extrusion industry leaders who will share their technical knowledge and experience.

- **Find answers to questions on popular aluminum extrusion topics**, including specifications, alloys and tempers, standard tolerances, building codes, sustainability, finishing, fabrication and more.

- **Explore aluminum extrusion applications**, including LED lighting, signage, crash management for automotive structures, and more.

- **Earn CEUs and PDHs in one convenient place!** AEC is submitting the presentations at EDU ‘18 for continuing education learning units for building professionals. In addition, many of the presentations should provide engineers with credits for their state PDH program. Get your professional development requirements accomplished at EDU ‘18.

- **Meet with dozens of aluminum extrusion manufacturers and related suppliers** who will be on hand at the EDU Expo to discuss their capabilities, offer solutions and connect you with a reliable source for your next aluminum extrusion project!

- **Connect with fellow designers and engineers, develop relationships and share challenges at the EDU ‘18 networking events.**

AEC.org/EDU18
EDU '18 Expo

EDU '18 includes a small exhibition hall featuring displays by aluminum extruders and industry suppliers. EDU Expo provides an opportunity to connect with leading extrusion manufacturers and suppliers who will be showcasing their latest innovations, technologies and manufacturing capabilities—all in one convenient place! See page 5 for details.

Hotel Reservations

EDU '18 will take place at the Chicago Marriott O'Hare Hotel in Chicago, Illinois conveniently located near O'Hare International Airport. A block of rooms is reserved for EDU '18 participants at the special discounted rate of $169 USD/night plus tax (single or double) between the dates of May 13 to May 18, 2018. To take advantage of the discounted rate, make your reservations directly with the hotel no later than April 22, 2018. After that date the special rate expires and rooms will be available at the prevailing rate, which is likely to be much higher. If calling to make your reservation, be sure to mention the Aluminum Extruders Council to obtain the group rate.

Chicago Marriott O'Hare Hotel
8535 West Higgins Road
Chicago, Illinois 60631 USA

For Reservations, please call or go online:
1.773.693.4444
AEC.org/EDU18 for online reservations

EDU ’18
Extrusion Design University

Schedule at a Glance

MONDAY, MAY 14
8:00 a.m. – 5:00 p.m.  Registration Open
8:00 a.m. – 5:00 p.m.  Anodizing Essentials Workshop*
8:30 a.m. – 4:00 p.m.  Determining the Strength of Aluminum Extruded Members Seminar*
5:30 p.m. – 7:30 p.m.  Welcome Reception sponsored by Light Metal Age

TUESDAY, MAY 15
7:00 a.m. – 8:00 a.m.  Breakfast
7:00 a.m. – 5:00 p.m.  Registration Open
8:00 a.m. – 9:30 a.m.  General Session
9:30 a.m. – 7:00 p.m.  EDU Expo Open
10:15 a.m. – 11:30 a.m.  Concurrent Educational Sessions
Noon – 1:00 p.m.  Lunch
1:15 p.m. – 5:00 p.m.  Concurrent Educational Sessions
5:30 p.m. – 7:00 p.m.  Reception in EDU Expo

WEDNESDAY, MAY 16
7:00 a.m. – 7:45 a.m.  Breakfast
7:00 a.m. – Noon  Registration Open
7:00 a.m. – 10:00 a.m.  EDU Expo Open
8:00 a.m. – 12:15 p.m.  Concurrent Educational Sessions
12:30 p.m. – 5:00 p.m.  Optional Extrusion Plant Tour*

Conference Adjourns

THURSDAY, MAY 17
7:00 a.m. – 8:00 a.m.  Workshop Registration Open
8:00 a.m. – 5:00 p.m.  Extrusion Excellence Course*

* Additional registration required. See registration form for details.
The Program

The General Session at EDU ’18 focuses on the wealth of possibilities in the aluminum extrusion industry. Engaging speakers bring insight and perspective, equipping delegates with the emerging information they need to better understand and utilize aluminum extrusions.

General Session

Tuesday, May 15
8:00 a.m. – 9:30 a.m.

Welcome & Aluminum Extrusion Industry Overview

Jeff Henderson,
President
Aluminum Extruders Council

Jeff Henderson, president of the AEC, will provide a general overview of the industry and the Aluminum Extruders Council to provide delegates with an understanding of the importance of this industry to the economy and manufacturing. Topics will include an overview of the Aluminum Extrusion Fair Trade efforts, the Council’s focus on expanding knowledge of aluminum extrusions with the design, engineering and academic communities, and its commitment to helping AEC members overcome the challenges that arise in a competitive manufacturing environment through benchmarking, training and education.

2018 Aluminum Extrusion Design Competition Winners Announcement

Jason Pickering,
VP of Operations,
Bonnell Aluminum

Each year, AEC—through the educational and research organization, the ET Foundation—conducts a design competition. This year, the competition, sponsored by Bonnell Aluminum, is open to professionals and students. The winning designs will be announced during the General Session. For details on the competition and to learn how you can enter, visit www.ETFdesign.org.

The Beauty of Aluminum Extrusion Design: Solution Development

Ben Kuhn, Project Manager and
Rob Nelson, VP Sales & Marketing
Almag Aluminum

Identifying how to link industry and customer together to create an exact solution, rather than a result, is the focus of this presentation, which covers the collaborative design, engineering, and implementation of a custom structural stringer application that embodies the desirable appearance of aluminum extrusions. The project highlights the benefits of cross-industry partnership that allows for progressive product development, demonstrating how to solve the continuous tug of war between design and engineering and how to identify the unknowns in a project to develop a product with the necessary flexibility.

Educational Breakout Sessions

Tuesday, May 15
10:15 a.m. – 5:00 p.m.

Wednesday, May 16
8:00 a.m. – 12:15 p.m.

The EDU ’18 program features more than 20 breakout sessions arranged in topic-specific tracks so you can easily choose the sessions most relevant to you. Breakout sessions occur on Tuesday, May 15 and Wednesday, May 16. Some sessions have been approved for AIA continuing education learning units and are marked as such in the program pages following.

Times subject to change. AEC reserves the right to alter the schedule and substitute speakers as needed.
Add-On Workshops

Enhance your knowledge and advance your career with add-on workshops. The following courses are being held in conjunction with EDU '18. Additional registration and fees apply. For more information, visit AEC.org/EDU18 and choose “Add-on Workshops” from the Program menu.

**Anodizing Essentials Workshop**
**Monday, May 14 | 8:00 a.m. – 5:00 p.m.**
Instructors: Various AAC Member Experts  
Cost: $400 (AAC members); $800 (nonmembers)

Anodizing Essentials is designed to increase the knowledge and ability of anyone involved in operating an anodizing line. The one-day program for anodizers teaches the fundamentals and the foundation of quality anodizing. 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.

**Determining the Strength of Aluminum Extruded Members Seminar**
**Monday, May 14 | 8:30 a.m. – 4:00 p.m.**  
Instructor: Randy Kissell, PE, Trinity Consultants  
Cost: $450 (AEC members); $650 (nonmembers)

Aluminum extrusions are often used where they must provide structural support – for example, as framing members in screened enclosures around swimming pools, as mullions in curtain walls, or as beams supporting flatbed trailers for highway use. For successful applications of these types, designers must be able to determine the forces that the extrusions can withstand. Aluminum extrusions have a great advantage over other products for such applications because they can readily be produced in custom and complicated cross sections. The down side, though, is that it can be difficult to calculate the strength of members made of such shapes. The Specification for Aluminum Structures, published by The Aluminum Association, provides tools to overcome this challenge, enabling designers to exploit the versatility of aluminum extrusions. The purpose of this session is to teach designers how to use these powerful tools.

**Extrusion Excellence Short Course**
**Thursday, May 17 | 8:00 a.m. – 5:00 p.m.**  
Instructor: Dr. Wojtek Misiolek, Director, Loewy Institute at Lehigh University  
Cost: $450 (AEC Members); $650 (nonmembers)

The Extrusion Excellence short course is an intensive one-day educational seminar that brings together aluminum extrusion theory and practice and providing a fundamental engineering approach to the aluminum extrusion process. The topics covered will include the extrusion process from billet production through the press to the runout table and will enable you to offer your customers better assistance and better understand their needs.
EDU ’18 Expo Exhibitors

The following aluminum extrusion industry companies will be exhibiting at EDU ’18. For complete information and updates to the exhibitor list, visit AEC.org/EDU18.

**www.almag.com**

Complex, thin wall, tight tolerance, high visual aluminum with elements of design, fabrication and finishing products.

**www.bonnellaluminum.com**

Bonnell Aluminum is a leader in extruding, fabricating, machining, finishing and packaging of aluminum extrusions. We are recognized for providing superior quality and exceptional customer service to our customers.

**www.custom-aluminum.com**

Aluminum extruder, 5 presses, 7”, 8”, and 10” diameter. Capabilities include fabrication, precision machining, paint, powder coat, anodize, bending, welding, kitting, final pack-out, and assemble. Inventory programs with 5 day delivery.

**www.grancoclark.com**

Granco Clark is a global leader in the aluminum extrusion industry manufacturing a full range of equipment required to heat, cool, pull, stretch, cut, stack, age and store aluminum extrusions.

**www.jordanaluminum.com**

Samples of fabricated aluminum extruded products and marketing material.

**www.taberextrusions.com**

At Taber if you can dream it, we can shape it. From our extensive extrusion (hard and soft alloy) to value added services. Taber is your full service partner.

**www.valmont.com**

Anodize samples (colors, graphics), anodize types (Type II and Type III), powder coat samples, brochures and video.

**Aluminum Extrusion Plant Tour**

**Wednesday, May 16 | 12:30 p.m.– 5:00 p.m.**

Optional Tour

To aid in learning objectives at EDU ’18, an optional tour of the Custom Aluminum Products facility in Genoa, Illinois, approximately one hour west of O’Hare Airport, will be offered.

Custom Aluminum Products is a family owned and operated business that is recognized as a leader in the aluminum extrusion industry. The company provides a full array of manufacturing capabilities, from extrusion and fabrication to engineering, finishing and assembly for a wide array of customers in various extrusion end markets. The tour of the Genoa facility will provide a look at the extrusion, paint and fabrication operations. Roundtrip transportation will be provided leaving immediately following the conference and returning participants to the hotel by 5:00 pm. Participation is subject to final approval by the tour host.
Automotive/Transportation Track
Specifying & Achieving Desired Performance for Automotive Applications
Mark Butterfield, VP Engineering & Manufacturing; Magnode Corp., a division of Shape Corp.
As automotive aluminum extrusion applications continue to grow, engineers seeking optimized performance are increasingly going beyond the “shorthand” of alloy and temper designation by specifying the desired microstructure for the final component. Learn how various automotive applications require differing underlying microstructure for optimal performance and how alloy chemistry and extrusion processing can be manipulated to yield distinctive microstructure in this educational session. Mini-cases will be used to illustrate successful application of microstructure specification. 

Aluminum Extrusion Alloys for Transportation Lightweighting Programs
Jerome Fourmann, Technical Director Global Customer Support & Product—Development Commercial Primary Aluminum
Rio Tinto Aluminum
Engineered products using aluminum extrusions provide a number of options and solutions. This presentation will discuss how aluminum extrusion can help meet tomorrow’s fuel economy targets while providing the comfort, safety, and performance that consumers demand. A variety of alloys suited to transportation applications will be reviewed along with their characteristics, industry standards and performance impact.

Anodizing for Automotive Applications
Speaker TBD
Anodizing processes have been used for decades in a wide range of products as solutions for everything from aesthetics to corrosion protection. This session will outline anodizing processes specifically geared to automotive applications. The features and benefits anodizing for any automotive component requirements will be discussed. (need more technical terminology from speakers)

B&C Track
Energy and Green Building Codes 101 – Aluminum Extrusions & Fenestration
Thomas Culp, Ph D
Birch Point Consulting, LLC
This presentation will give a “101” introduction to how energy and green building codes work, and how they impact aluminum extrusions in the B&C sector, including aluminum framed windows, sun shades, and PV panels. In addition, a preview of where the codes are headed in the next 5+ years, and the impact on different technologies, will be presented. 

Architectural Applications for Liquid & Powder Fluoropolymer Coatings – An Objective Review
Scott Moffatt, Architectural Sales Manager – Industrial Coatings
PPG Industries
This session will provide architects with information that will help them understand the advantages and disadvantages of liquid and powder coating technologies for the architectural markets. Participants will learn about the markets, the different coating technologies, manufacturing processes and application methods. The main benefit of the course will be to aid architects in the coating selection process. This includes information on appearance, end use, cost and other factors.

What EPDs Tell us about Aluminum Extrusions for Building and Construction
Shayne Seever, VP Administration
Sierra Aluminum
While Environmental Product Declarations (EPDs) must be developed in accordance with ISO standard 14025, EPD results can vary significantly based on the representativeness and completeness of the primary data considered, the secondary data sets utilized, and the assumptions, allocations (e.g. for key inputs) and end-of-life treatments that have been employed.

This one-hour session will help participants assess EPD validity and analyze the impact of specifier decisions on the environmental footprint of extruded aluminum products, by reviewing the industry-wide EPD recently completed for the Aluminum Extruders Council (AEC).

Thermal Break: Optimizing Performance in Commercial Fenestration
Jerry Schwabauer, Patrick Muessig
Azon USA
This session provides an overview of optimizing commercial fenestration with thermal barriers and high-performance glazing components in aluminum windows, storefront, and curtain wall framing in the building envelope. Learn about the importance of optimizing efficiency in commercial buildings and initiatives to reduce energy consumption. The performance of aluminum window, storefront, and curtain wall fenestration systems will be evaluated. Material sustainability, thermal and structural performance, noise abatement and condensation resistance will also be discussed. Through the use of multiple case studies, a range of fenestration product types, measured performance outcomes and energy savings, LEED, PassiveHouse and Cradle-to-Cradle contribution will be highlighted.

AEC reserves the right to alter the schedule and substitute speakers as needed.
**Engineered Products/Industrial Track**

**Aluminum Standards, Specifications and Tolerances**

**John Weritz,**
Vice President, Standards & Technology
The Aluminum Association

This session will cover the Aluminum Association standards, specification and tolerances when designing aluminum extrusions. We will look at commercial standard tolerances, alloy specifications, and other aluminum standards that will allow you to create the right design for the performance requirements of your next project.

**Specifying Aluminum Extrusions: Understanding the ASTM B221/B221M Standard**

**Greg Lea,**
Regional Sales Manager; Hydro Aluminum Metals USA

ASTM B221 and B221M is a material specification standard for aluminum extruded bars, rods, wire, profiles and tubes. The requirements are in place to give the purchaser confidence that the product is produced to their expectations and are consistent with the same products regardless of the producer.

This session provides an overview of the ASTM B221/B221M standard and covers pertinent sections of the standard to help the learner better understand the ordering process for aluminum extrusions when ordering to an ASTM standard, as well as explaining what to expect from the manufacturer.

**Utilization of Aluminum Extrusion in LED Fixtures**

**David Lee,**
Territory Sales Manager
Almag Aluminum

Aluminum extrusions are present in a multitude of components that make up a light fixture in today’s lighting industry – and with very good reason. The recent advancement of extrusion technology, as well as the inherent properties of aluminum, makes choosing aluminum extrusions as a light fixture component an easy choice. Aluminum has a high strength-to-weight ratio and great corrosion resistance, which make it ideal for light housings, as well as high thermal conductivity, which make it great for heatsinks. Aluminum extrusions are also soft enough to be formed prior to age hardening, yet hard enough to facilitate good machinability afterwards. Understanding the benefits and limits of aluminum extrusions will help provide a better solution to light fixture designs.

**Fabrication: Adding Value to Aluminum Extrusions, When & How**

**Mark Butterfield,**
VP Engineering & Manufacturing
Magnode, A division of Shape Corp.

Over the last two decades extruders have extended their offerings to the marketplace in the way of fabricated aluminum extrusions. From precision cutting to CNC machining, extruders are adept at delivering a final part straight to your production line. However, the question is: where in the manufacturing continuum should you ask your supplier to deliver? This session will help you determine what options are available and how they can transform the way you make your products.

**Taste of ET Track**

This track features Award-Winning technical presentations from the Eleventh International Aluminum Extrusion Technology Seminar – ET’16

**Innovations in Billet Casting and Homogenization**

**Jostein Royset,**
Dr. Ing., Principal Research Scientist; Hydro Research & Technology Development

A new casting technology that nearly eliminates the inverse segregation zone has enabled homogenization cycle development that provides extrudability and profile surface quality advantages. In homogenization of 6xxx alloys, past focus has been on dissolving MgSi, transformation of AlFeSi to AlFeSi, and on spheronidization of AlFeSi particles, largely ignoring the amount of Fe and Mn in solid solution after homogenization. An overview of several trials shows that by using homogenization cycles designed to minimize Fe and Mn amounts in solid solution while fulfilling the other criteria expected from proper homogenization, significant improvements in press performance and profile surface quality are measured. Examples of the impact of these innovations on extruded profile surface quality are given.

*For more information and updates, please visit our conference website at [AEC.org/EDU18](http://AEC.org/EDU18).*
HybrEX® - An Innovative Extrusion Press with Hybrid Drive Technology

John Bergman,
General Manager – Business & Product Development Extrusion
SMS Group

Radical new approaches are reducing the hydraulic drive of the extrusion press, minimizing energy consumption, increasing productivity, and implicating an unmatched dynamic to the extrusion process. These recent developments target increased energy efficiency and productivity. A hybrid drive concept with highly dynamic servo drives for fast movements, a new unique hydraulic design combined with the novel HMI-system with joystick controls are highlights of the HybrEx press. Its integrated housing includes a safety concept bringing contemporary industrial design into the press shop. PICOS-TO-GO allows for online monitoring of the extrusion press by mobile devices, and includes a smart platform-independent browser-based application.

Extrusions Alloys and Process Parameters for Automotive Crash Applications

Jerome Fourmann,
Technical Director
 Global Customer Support & Product—Development Commercial Primary Aluminum
Rio Tinto Aluminum

One major extrusion automotive application is crash structures: crash rails, crash cans, bumpers and structural body components. Extruding thin-wall multivoid extrusions contributes to optimizing energy absorption for a given structural weight, but the alloy used plays a significant role in producing required geometry and strength, which to a large extent controls energy absorption capability and ductility or fracture behavior, which controls the strain applied locally during crush deformation before cracking. A test program examining crush behavior for a range of alloys for automotive applications is described as a function of processing parameters, including artificial Aging and quench practices.

Modelling the Effect of Mn on Extrudability, Mechanical Properties and Grain Structure of AA6082 Alloys

Richard Dickson,
Director Customer Training and Development
Hydro Aluminum Metals USA

This award-winning paper demonstrates the effect of manganese (Mn) in 6082-type alloys on extrudability, as-extruded grain structure, and mechanical properties by the use of Through Process Modeling (TPM). In order to separate the effect of Mn in dispersoids and Mn in solid solution, a rather comprehensive experimental program was designed including six different levels of Mn (0-1.2 wt%) within the 6082 window, and two specific homogenization cycles prior to extrusion and mechanical testing. The TPM methodology includes physical-based microstructure models for precipitation of Mn-dispersoids and MgSi-phases, as well as models for generation of deformation and recrystallization structures in combination with finite element (FE) simulations of the extrusion process. The input parameters to the TPM models comprise the chemical composition of the alloys and the processing parameters from casting, homogenization, extrusion, and annealing to the final artificial aging. Comparisons between simulation results and measurements have confirmed the ability of the present TPM methodology to predict changes in extrusion forces, grain structures, and mechanical properties without any tuning or calibration of the modeling parameters.

Automotive/Transportation Track

Al-Mg-Si Alloys with Improved Crush Properties

Jostein Royset,
Dr. Ing., Principal Research Scientist; Hydro Research & Technology Development

Crush performance is a critical parameter in alloy selection for many extruded aluminum structural automotive components. In the event of a crash, such components are supposed to absorb large amounts of kinetic energy while retaining their structural integrity (i.e. not break into pieces). For soft Al-Mg-Si alloys with yield strength requirements of 180MPa (26 ksi) or below, it is fairly easy to obtain good crush-properties with ample degree of freedom for alloy composition and processing conditions. This session, first presented at the Ninth International Aluminum Extrusion Technology Seminar (ET ‘08), summarizes a systematic approach for developing Al-Mg-Si alloys optimized for crush properties.
For more information and updates, please visit our conference website at AEC.org/EDU18.

Aluminum Alloys, Machining & Fabrication

**Calvin Wiggins,**
Director of Quality & Technical Sales Service
**Service Center Metals**

For over a century, aluminum has been used in transportation applications mainly due to its high strength-to-weight ratio. Used by early automotive and aircraft pioneers such as Karl Benz and the Wright Brothers, aluminum alloys for vehicle light-weighting has recently accelerated in the automotive sector due to the increased demands for higher fuel economy and performance. Machined aluminum rod & bar alloys have advanced as industry demands and fabrication equipment have evolved to support industry changes. This session will help you understand basic alloy and temper selection for your next machining project and will discuss the best fabrication processes for a variety of applications.

**Alloy Selection: Caught Between a Rock and a "Hard" Place**

**Jason Weber,**
VP Sales & Marketing
**Taber Extrusions**

As automotive (and other OEM’s) strive to lighten structures and use stronger alloys, 7xxx alloys continue to gain favor with engineers and specifiers. However, many call outs for 7xxx and other “hard” alloys like 2xxx and 5xxx aluminum in extruded profiles may be unknowingly limiting sources for extruded product. This session will review the do’s and don’ts for designing with “hard” alloys as well as cover potential opportunities in costs savings through designing larger circle size profiles with common extrusion alloys.

**B&C Track**

**Curtain Wall & Façade Architectural Metal Restoration & Maintenance**

**Chris Incorvaia**
National Manager Façade Restoration
**Rex Dean**
Global Director Façade Restoration
**Stuart Dean**

Explore and study the “skin” of the building and capture what the speakers discover using digital photography, field measurements, and detailed notes. The instructors view the façade of the building in a holistic manner focused on the architectural metals and their protective coating systems. By doing so, they determine the current functionality and condition of various building materials originally designed to provide a safe, durable and attractive building enclosure. Topics covered include observations of Class I & 2 Anodized Aluminum as well as AAMA 2603, 2604, and 2605 finishes and methods of maintenance and repair.

**Aluminum Extrusion Anodizing for B&C Applications: What You Should Know**

**Eric Koger,**
Finishing Manager
**Bonnell Aluminum**

Attend this informative session to better understand the requirements deemed “critical to success” to anodizing for aluminum extrusions in building & construction applications. The differences between various anodizing types (Class I, II and III), clear versus 2-step, the relative strengths and weaknesses of each anodizing type, comparisons with AAMA 2603 and 2605 coatings, corrosion resistance and common types of corrosion, the effect of alloys and temper and the importance of die maintenance to achieve finish consistency will be reviewed. The cleaning and maintenance specifications (AAMA 609-610) required to maintain finish durability and testing requirements to ensure anodizing quality will be discussed.

**Storefront or Curtain Wall? Seeing Through the Difference**

**Doug Dietrich,**
AIA, CSI, CDT,
Architectural Representative
**TubeLite Inc.**

This session includes a basic review of storefront and curtain wall glazing systems. The session will examine industry standards and performance attributes for commercial glazing systems, enabling the design professional to select the appropriate system for a specific site. Participants will be able to select between storefront and curtain wall systems for commercial applications as they relate to occupant safety, environmental factors, system performance attributes, system limitations and proper product installation in terms of indoor environmental quality, human health and safety, and examine advancements in system performance in regards to energy-saving thermal performance.

**Engineered Products/Industrial Track**

**Extrusion Design through Visual Applications**

**Rob Nelson,**
VP Sales & Manufacturing
**Almag Aluminum**

Aluminum extrusions are used in all types of applications that support the Signage industry. Aluminum’s high strength-to-weight ratio and great corrosion resistance make it an optimal choice for frames and fixtures for visual displays. Whether the application is in an indoor retail space or harsh external environment, aluminum meets the challenge. In most cases, the signage is not about the extrusion but about the advertisement and this presentation will explore fit, form and function of a rapidly growing industry.
Optimizing Your Extrusion Design
Shane Tredup, VP Operations
Custom Aluminum

This session will outline the design and fabrication options available to you when creating your next part or product. Take a holistic view of the design and manufacturing process using aluminum extrusions to understand which element of your part should be custom designed in the profile versus fabricating or machining. Understanding the principles that make hollow and semi-hollow shapes different, designing a profile to eliminate additional steps and using multiple extrusions to reduce circle size and thin walls are just some of the topics covered in this informative session. Knowing these techniques can save your company time and expense by finding the right balance.

Aluminum Extrusion & Sustainability
Angela Ellis, Sales Manager
Alcoa Corporation

The importance and number of sustainability-related concepts are constantly growing, in North America as well as globally. This session aims to describe the processes and opportunities for product differentiation in the aluminum extrusion industry in regards to sustainability. Alcoa as a recognized sustainability leader with 15 years on the Dow Jones Sustainability Index and member of the Aluminum Stewardship Initiative will give their views on this hot topic.

Taste of ET Track
This track features Award-Winning technical presentations from the Eleventh International Aluminum Extrusion Technology Seminar – ET’16

A Novel Methodology for Optimization of Properties, Costs and Sustainability of Aluminum Extrusions
Richard Dickson, Director Customer Training & Development; Hydro Aluminium Metals USA

An innovative methodology is described for optimizing product properties, production costs and environmental impact in fabrication of 6xxx-series aluminum extrusions. Operations use predictive models, for material, mechanical, cost, and sustainability. An optimization platform combines models into a common software environment. Software optimizes mechanical properties and electrical conductivity by manipulating microstructure characteristics like grain structure, precipitates, dispersoids and solid solution concentrations. Material and production costs, and CO2 emissions along the value chain were kept at minimum levels. Optimization models range from physically-based material models and Finite Element (FE) codes, to models for raw-material and processing costs and CO2 footprint.

Surface Topography of Aluminum Extrusions after Caustic and Acid Etching and Its Implications for Streaking Defects
Jerome Fourmann, Technical Director, Commercial Primary Aluminum
Rio Tinto

Caustic or acid etching is used to pretreat aluminum extrusions in an anodizing line. Apart from surface cleaning, it removes die lines, pickups and rough surface patches on extruded profiles, and reduces substrate gloss, obtaining consistent surface appearance post-anodizing. Commercially anodized extrusions are examined, comparing surface topography of caustic-etched and acid-etched extrusions. Streaking defects are investigated, illustrating defect formation mechanism differences due to different etching methods. Acid etching is shown to significantly reduce occurrence of compositional and die streaks. However, certain streaking defects may still be visible on anodized extrusions. Root causes of streaking defects are discussed and preventive measures are recommended.

Advanced Aluminum Alloys used in the Manufacture of Products in Extrusion Process
Pawel Kazanowski, Director – New Product & Application, North America
Hydro Precision Tubing

Research was conducted on AlCuMgMn alloy with addition of Zirconium (Zr) and Scandium (Sc) manufactured as extruded bars, profiles or tubes. Results of structure evolution and mechanical properties are presented for different tempers of precipitation strengthening. AlCuMgMn(ZrSc) alloy produced in powder form is also investigated. This alloy powder was subjected to consolidation during direct hot extrusion. The study aims to optimize the Al alloy powder hot extrusion process using conical dies. Results (Rm above 500Mpa for AlCuMg alloy) show significant possibilities for manufacturing from aluminum alloy powder products with ultrafine grain structure.

AEC reserves the right to alter the schedule and substitute speakers as needed.
**REGISTRATION FORM**

**EDU ‘18 Extrusion Design University**
May 14 – 16, 2018 • Chicago Marriott O'Hare

Register Early! Only those registered may attend scheduled functions. Registration fees include all as-registered program sessions, entrance to the EDU Expo, take-home materials, scheduled receptions, meals and breaks. Please print legibly. To register online, go to [AEC.org/EDU18](http://AEC.org/EDU18).

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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

☐ Check here if you require assistance to fully participate. AEC will contact you.

### Registration Fees
Please choose from the following registration options:

<table>
<thead>
<tr>
<th>U.S. dollars only</th>
<th>Early Registration Fee by March 9, 2018</th>
<th>Early Registration Fee After March 9, 2018</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ EDU ’18</td>
<td>$549</td>
<td>$599</td>
<td>$</td>
</tr>
<tr>
<td>☐ Yes, I will attend the Optional Plant Tour</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Add-On Workshops

<table>
<thead>
<tr>
<th></th>
<th>Member Price</th>
<th>Non-member Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Determining the Strength of Aluminum</td>
<td>$450</td>
<td>$650</td>
</tr>
<tr>
<td>☐ AAC Anodizing Essentials</td>
<td>$400</td>
<td>$800</td>
</tr>
<tr>
<td>☐ AEC Extrusion Excellence</td>
<td>$450</td>
<td>$650</td>
</tr>
</tbody>
</table>

**GRAND TOTAL =** $

### PAYMENT

☐ Check enclosed for $__________ (Make check payable to Aluminum Extruders Council)

☐ Or charge by Credit Card ☐ VISA ☐ MasterCard ☐ AmEx ☐ Discover

Required Printed Name of Cardholder ____________________________

Signature ____________________________

Billing Address (if different than above) ____________________________

For your protection, this portion of the form will be destroyed after processing your credit card information.

Card Number ____________________________

Exp. Date ____________________________  V-Code ____________________________

(3- or 4-digit verification code on card)

**Hotel Reservations & Info**
Chicago Marriott O’Hare Hotel
8535 West Higgins Road
Chicago, Illinois 60631 USA

Phone Reservations: 1.773.693.4444

Online reservations: please visit [www.AEC.org/EDU18](http://www.AEC.org/EDU18)

Reservations, cancellations and changes to accommodations must be made directly with the Chicago Marriott O’Hare Chicago. Be sure to mention AEC to receive the discounted rate of $169 USD/night plus tax (single or double) between the dates of May 13 to May 18, 2018 No later than April 21, 2018. 5:00 p.m. CST

Be aware that rooms at this special rate may sell out before the AEC group rate deadline of April 22, 2018, so make your room reservation as soon as possible.

SEND COMPLETED REGISTRATION FORMS AND PAYMENT TO:
1000 N. Rand Road, Suite 214
Wauconda, IL 60084 USA

OR SECURE FAX: 847.526.3993

NOTE: For your protection, please do not email form with credit card information. Please fax or mail completed form to AEC.

**CANCELLATION POLICY**
Registration fees will be refunded only if written notice is received at the Executive Office on or before May 7, 2018. A 20% administrative fee will be deducted from the refund. Substitutions may be made at any time.

**FOR AEC OFFICE USE ONLY**

ENTERED ____________________________

ID# ____________________________

TYPE ____________________________

CK # ____________________________

AMT $ ____________________________

1000 N. Rand Road, Suite 214
Wauconda, IL 60084 USA

ph 847.416.7219

fx 847.526.3993