Pre-Show Guide

AFS METALCASTING CONGRESS

SHAPING TOMORROW IN METALCASTING

April 14 – 16, 2026 | Grand Rapids, MI

Metalcastingcongress.com

Presented by the American Foundry Society
afsinc.org

Shape the future of the industry at Metalcasting Congress 2026

Get ready for a showcase of cutting-edge metalcasting technology, manufacturing innovations, and business insights at the DeVos Place Convention Center in Grand Rapids from April 14 - 16, 2026. Elevate your expertise at Metalcasting Congress 2026 and gain the momentum you need to succeed!

Get up close to the future of metalcasting

From smart manufacturing innovations to alloy-specific content, Metalcasting Congress provides you with exclusive previews of the trends and advancements set to mold the industry for years to come.

Discover endless opportunities

Immerse yourself in live panels and presentations, engage in insightful discussions with metalcasting experts, and link up with leading industry suppliers and service providers. Explore ways to optimize your operations and boost profitability at Metalcasting Congress 2026.

Connect with the best

Metalcasting Congress unites professionals from around the globe, all dedicated to advancing their businesses and the metalcasting industry. Whether you're meeting with seasoned veterans or emerging leaders, you'll make valuable connections that will guide you along your professional journey.

Who Should Attend Metalcasting Congress?

If you work anywhere within the worldwide metalcasting supply chain, you'll fit right in! More than 2,000 of your peers are expected to be at Metalcasting Congress 2026, including (but certainly not limited to):

- Foundry owners & executives
- Engineers
- Plant managers
- HR managers
- Sales managers
- Workforce trainers
  Management trainees
- Metallurgists
- EHS personnel
- Automation professionals
- Technical specialists
- Parts buyers/OEM representatives
- Parts designers/specialists
- Graduate & undergraduate students
- Researchers and academics
- Young Professionals

What You'll Experience at Metalcasting Congress

Supplier Exhibits

Check out displays from 200-plus exhibitors providing equipment, services, and consumables for the full spectrum of foundry needs and applications.

Foundry Exhibits (Cast in North America)

Leading North American foundries will share the latest services and capabilities with designers, buyers, and OEMs in the capstone of the supply chain, the Cast in North America (CINA) pavilion.

Education & Research

Find a wealth of thought-provoking presentations, technical breakthroughs, AFS Institute classes, and panel discussions geared toward improved operations, better efficiency, and higher quality.

Environmental, Health & Safety Knowledge

Metalcasters prioritize workplace safety and environmental responsibility above all else. At Metalcasting Congress 2026, you'll find a spotlight on the most recent advancements in foundry EHS, featuring presentations by seasoned experts and the latest equipment and services.

Smart Manufacturing Insights

Whether you're at the forefront of Industry 4.0 or just getting started, Metalcasting Congress 2026 delivers actionable ideas for integrating automation, additive manufacturing, and other high-tech manufacturing tools into your everyday operations.

Lectures, Keynotes, & Special Events

From the Hoyt Memorial Lecture – one of the industry's most respected annual presentations – to engaging keynotes, banquets, and awards presentations, Metalcasting Congress highlights the best in industry knowledge-sharing and honors. This year's event even features a keynote from former Major League Baseball pitcher Jim Abbott!

Sessions at Metalcasting Congress 2026 cover all major alloys and processes. Selected topics include:

- Artificial Intelligence (AI)
- Additive manufacturing
- Casting design & purchasing
- Engineering
- Environmental, health & safety
- Ferrous & nonferrous alloys
- Young Professionals
- Industry 4.0
- Marketing & sales
- Melting
- Molding
- Pouring
- Quality control
- Workforce development
- Women in Metalcasting
- Metalcasting Research
- Investment Casting
- Lost Foam

Show Location & Schedule

DeVos Place Convention Center
303 Monroe Ave NW
Grand Rapids, MI 49503

Tuesday, April 14	Wednesday, April 15	Thursday, April 16
8 a.m. – 4:45 p.m.	*8 a.m. – 4:45 p.m.*	*7 – 8 a.m.*
Technical & Management Sessions	Technical & Management Sessions	Copper Division Breakfast (Ticket required)
8 – 10 a.m.	*8 – 10 a.m.*	*8 – 10 a.m.*
AFS Institute Course: Metalcasting Process Basics: Part 1	AFS Institute Course Preview: Introduction to Supervisor Development	AFS Institute Course: Introduction to Casting Alloys
8 a.m. – 5 p.m.	*9 a.m. – 6 p.m.*	*8 – 10:15 a.m.*
Exhibitor Set-up	Exhibits Open	Technical & Management Sessions
10:30 – 11:30 a.m.	*10:30 – 11:30 a.m.*	*9 a.m. – Noon*
Keynote Speaker: Olympic Gold Medalist, Jim Abbott	Hoyt Memorial Lecture: Randy Oehrlein	Exhibits Open
11:45 a.m. – 1:15 p.m.	*11:45 a.m. – 1 p.m.*	*Noon*
Volunteer Leadership Awards Luncheon (Ticket required)	Student Technical Research Contest	Metalcasting Congress 2026 Concludes
1:30 – 3:30 p.m.	*11:45 a.m. – 1:30 p.m.*	
AFS Institute Course: Metalcasting Process Basics: Part 2	Women in Metalcasting Luncheon (RSVP/Ticket Required)	
6 – 7 p.m.	*1:30 – 4:30 p.m.*	
Annual Banquet Reception (Cashless bar)	AFS Institute Course Preview: Introduction to Industry 4.0	
7 – 9 p.m.	*4:30 p.m.*	
Annual Banquet (Ticket required)	Exhibit Floor Reception	
9 – 10 p.m.	*5 p.m.*	
President's After-Party (Cashless bar)	AFS Young Professionals Networking Reception	
	6 – 9 p.m.	
	AFS Alumni Dinner (AFS Alumni only. Ticket required)	

Schedule is subject to change.

AFS Institute Courses

The AFS Institute, the industry's number one training source, presents exclusive courses tailored for Metalcasting Congress guests, included with the All-Access Pass Including Education Track.

Tuesday, April 14	Wednesday, April 15	Thursday, April 16
8 – 10 a.m.	*8 – 10 a.m.*	*8 – 10 a.m.*
Metalcasting Process Basics: Part 1 Patrick Kluesner *Grede Castings*	Preview: Introduction to Supervisor Development Patrick Frazier *ME Global Inc.*	Introduction to Casting Alloys Patrick Kluesner *Grede Castings*
1:30 – 3:30 p.m.	*1:30 – 4:30 p.m.*	
Metalcasting Process Basics: Part 2 Patrick Kluesner *Grede Castings*	Preview: Introduction to Industry 4.0 David Blondheim *Mercury Marine*	

Schedule is subject to change.

Casting Source Theater Schedule

Wednesday, April 15	*9 – 10:30 a.m.* *Casting Source* Theater Presentations	*11:45 a.m. – 1 p.m.* Student Technical Research Contest	*1 – 4:30 p.m.* *Casting Source* Theater Presentations
Thursday, April 16	*9 – 11 a.m.* *Casting Source* Theater Presentations		

Schedule is subject to change.

Shape the future at Metalcasting Congress

- Improve Casting Designs
- Optimize Molding Methods
- Refine Melting Techniques
- Advance Foundry Safety & Environmental Quality
- See Industry 4.0 and Plant Engineering Technologies
- Learn Talent Development Best Practices
- Young Professionals
- Women in Metalcasting
- All Metals - All Casting Processes

Exhibit at Metalcasting Congress 2026?

Want to feature your business at Metalcasting Congress 2026?

A limited number of exhibits for suppliers and metalcasters are available, but capacity is strictly capped – act quickly to guarantee space! Visit metalcastingcongress.com for contracts, floor plans, sponsorship opportunities, and more.

Keynote & Hoyt Lecture Speakers

Tuesday, April 14, 10:30 – 11:30 a.m.

Nothing Can Stop You

Jim Abbott
Former Major League Baseball Pitcher & Olympic Gold Medalist

Jim Abbott, a remarkable athlete and inspirational figure, delivers a powerful message of resilience, determination, and overcoming adversity. Born without a right hand, Abbott's journey to becoming a Major League Baseball pitcher is a testament to the human spirit's boundless potential. He also received a Gold Medal as an Olympian the first time baseball was an Olympic sport, and a University of Michigan Golden Spikes Award, the highest honor in college baseball.

His presentations are a blend of heartfelt storytelling, unwavering optimism, and a profound belief in the power of perseverance. His talk explores how do we learn to be grateful for the circumstances we are born into? And in the end, how we all can come to celebrate the challenges that make us who we are. Expect to be deeply moved and motivated as Abbott shares his experiences of defying the odds and achieving greatness in the face of challenges.

Abbott's approach is relatable and down-to-earth, emphasizing the importance of embracing differences, adapting to change, and never giving up on one's dreams. His talks transcend sports and touch on universal themes of courage, teamwork, and the potential that resides within all of us. His message resonates with audiences of all backgrounds, leaving a lasting impression that encourages individuals to strive for their personal best, regardless of the challenges they may face.

Wednesday, April 15, 10:30 – 11:30 a.m.

Foundry Manufacturing: Where Metallurgy Meets Mastery

Exploring the Dual Nature of Casting as Both Art and Science and its Unique Place in Manufacturing Technologies (26-097)

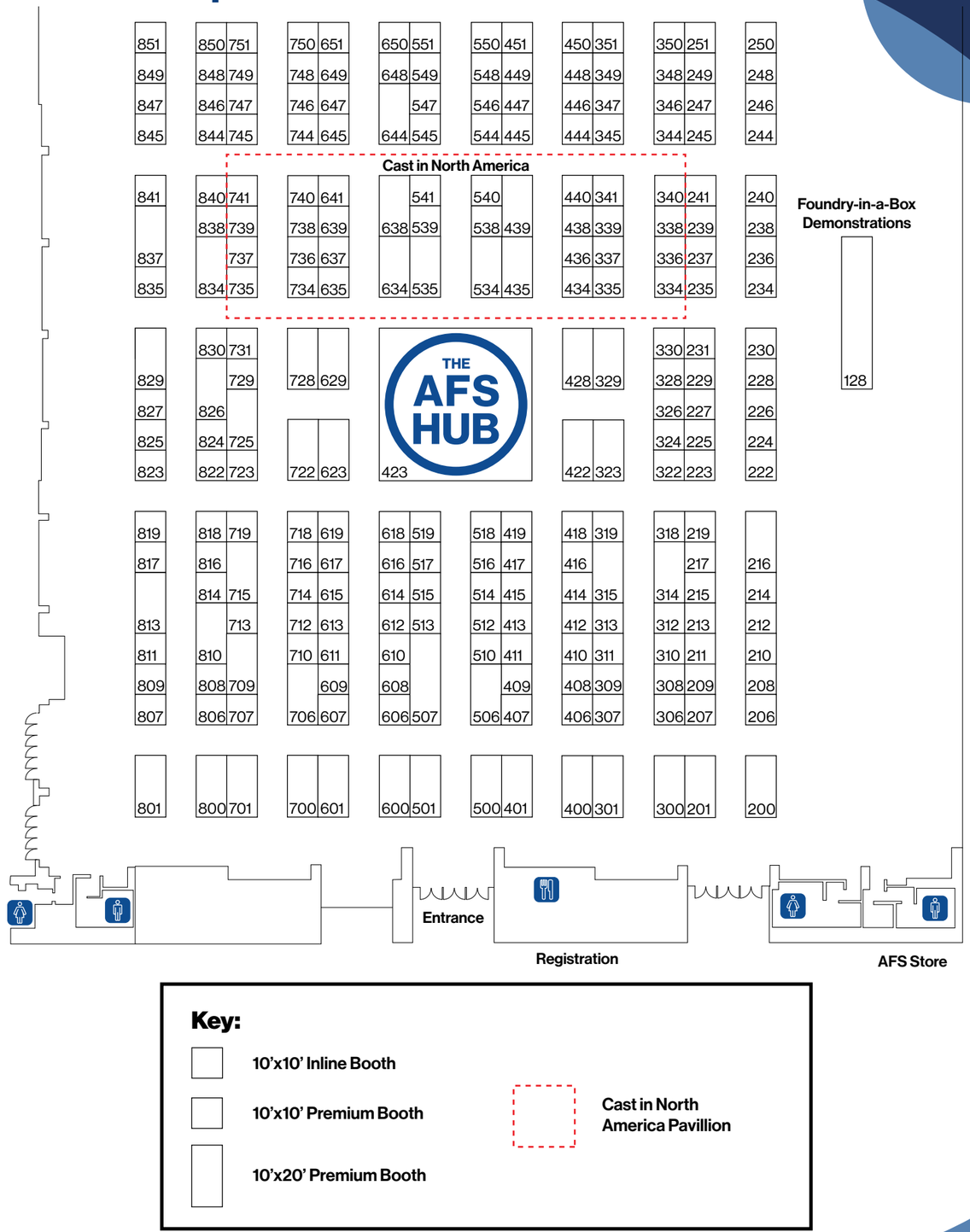
Randy Oehrlein
Vice President of Engineering, Carley Foundry

Foundry processes represent a unique intersection of art and science, blending precision engineering with creative problem solving. The science aspect is evident in metallurgy, thermodynamics and fluid mechanics, which dictate material behavior, casting integrity and defect prevention. Simultaneously the artistic dimension emerges in mold design, pattern-making, and the nuanced expertise required to manipulate molten metal into complex high-quality components. Mastery in foundry operations requires both empirical knowledge and intuitive craftsmanship, as professionals navigate variables such as material composition, cooling rates and intricate geometries. This synthesis of technical rigor and creative adaptation underscores the essential duality of foundry work, making it a field where science ensures reliability, while artistry refines excellence. This paper looks at the nature of manufacturing and how the foundry industry has, and will continue to, straddle science and art.

Randy has been involved with a wide range of foundry engineering tasks since 1974 and has been with Carley Foundry since 1999. With degrees in Mechanical Engineering and Machine Design, Randy serves as VP of Engineering, overseeing an experienced multi-disciplined team of engineers.

He is active at the national level in the American Foundry Society (AFS) Aluminum and Research Committees, and he serves as an instructor and training material contributor.

Showfloor Map



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Register Early & Save!

Experience Metalcasting Congress 2026 in two ways:
All-Access Pass Including Education Track - or - Exhibits Pass

For complete access to all that Metalcasting Congress 2026 has in store, including technical and management sessions, AFS Institute courses, keynotes, the Hoyt Memorial Lecture, and the exhibit floor, the All-Access Pass Including Education Track is the way to go.

If your plan is to view the exhibits plus keynotes and the Hoyt Memorial Lecture only, the Exhibits Pass is right for you.

Show Highlights	Exhibits Pass	All-Access Pass Including Education Track
Exhibit Floor	•	•
Keynote Speakers	•	•
Hoyt Memorial Lecture	•	•
Cast in North America	•	•
Casting Designers and Buyers Track	•	•
AFS Institute Courses		•
Technical Sessions		•
Management Sessions		•

Significant discounts are available for American Foundry Society members and those who register early. Current student members of AFS receive free admission. You can register online at metalcastingcongress.com. For information on becoming an AFS member, visit afsinc.org/join-afs. See the registration form on the next page for pricing. Special events, including the Volunteer Leadership Awards Luncheon and Annual Banquet, require a special ticket offered for purchase at registration. Pricing, details, and sign-up are on the back of the registration form.

Lodging & Travel

AFS has secured special rates for room blocks at several hotels. The host hotel is Amway Grand Plaza, 187 Monroe Ave NW, Grand Rapids, MI 49503. Visit metalcastingcongress.com for a full list of event hotels and more information on housing and transportation.

Connect with Us

The Metalcasting Congress 2026 App gives exhibitors and attendees a way to stay connected. The app includes a complete listing of all speakers, searchable directory of all sessions and exhibitors, viewable floor map and much more! Look for the app in April 2026.

Share your experiences with us on social media or keep up to date with the latest developments at ***metalcastingcongress.com***.

AFS METALCASTINGCONGRESS

April 14 – 16, 2026 | Grand Rapids, MI

Mail registration form to:
Metalcasting Congress 2026
American Foundry Society
1695 N. Penny Ln.
Schaumburg, IL 60173
- or -
Register online at:
metalcastingcongress.com
- or -
Fax to:
847-824-7848

Name _____ Title _____ Member ID# _____

Company _____ Address _____

City _____ State/Province _____ Zip/Postal Code _____ Country _____

Telephone _____ E-mail address _____

Spouse's/Domestic Partner's Name (if attending) _____

Metalcasting Congress 2026 Registration	Early Registration	Standard Registration	Onsite Registration
	Through Feb. 16, 2026	Feb. 17 – April 13, 2026	April 14 – 16, 2026
Members			
Exhibits Pass	$85	$100	$115
All-Access Pass including Education Track	$605	$650	$700
Non-Members			
Exhibits Pass	$195	$205	$220
All-Access Pass including Education Track	$760	$820	$880
Spouse/Domestic Partner	$85	$100	$115
Pre-Order Transactions 2026	$525 - Member | $700 - Non-member		

☐ Your email address will be used to communicate all registration information and will also be provided to exhibiting companies. ***Please check here if you do not wish to have your email address included in the post-show attendance file provided to exhibiting companies.***

Attention Students and Honorary Members:

STUDENTS
☐ Registration for AFS student members is complimentary. Please provide a copy of a valid student ID with your registration form and check here.

HONORARY
☐ Honorary members receive complimentary registration. Please check here.

Register For:

Members:
☐ **Exhibits Pass**
☐ **All-Access Pass including Education Track**

Non-Members:
☐ **Exhibits Pass**
☐ **All-Access Pass including Education Track**

Spouse/Domestic Partner:
☐ **Spouse/Domestic Partner Registration**

Pre-Order Transactions 2026
☐ **Member**
☐ **Non- Member**

Registration Total _____

Special Events Total * _____

Final Total _____

Are you attending the Exhibit Floor Reception on Wednesday, April 15th?
☐ **Yes** ☐ **No**

Payment Must Accompany Registration (US Dollars Only)
☐ Check (Payable to American Foundry Society) ☐ American Express® ☐ MasterCard® ☐ Visa®

Credit Card Account Number _____ Exp Date _____ CVC (Security Code) _____

Cardholder's Signature (Required for Processing) _____ Cardholder's Name (Please Print) _____

**See back of form for Special Events tickets, pricing, and descriptions.*
Individuals under the age of 16 are permitted if accompanied by an adult with a signed waiver. No one under the age of 16 is permitted on the exhibit floor during move-in and move-out periods. No cameras are permitted.
Cancellation/Substitution Policy—Cancellations ***must be received in writing by March 10, 2026***. Refunds on registration fees will be subject to a $25 administration fee. Refunds on Special Event tickets will not be subject to the administration fee but must also be in received writing by March 10, 2026. There will be ***NO REFUNDS after March 10, 2026***. Substitutions will be accepted at any time. Send cancellation requests to ***registration@metalcastingcongress.org*** or via fax to 847-824-7848.

Special Event Tickets

	Quantity	Fees
Volunteer Leadership Awards Luncheon $80 (Tuesday, April 14 | 11:45 a.m.)		
Annual Banquet $150 (Tuesday, April 14 | Cashless bar reception 6 p.m. | Banquet 7 p.m.)		
Women in Metalcasting Luncheon Free to AFS members, $80 for Non-Members (Wednesday, April 15 | 11:45 a.m.)		
Alumni Dinner at the Grand Rapids Public Museum $145 (Wednesday, April 15 | 6 p.m.) Must be AFS Alumni to attend		
Copper Division Breakfast $70 (Thursday, April 16 | 7 a.m.)		
	Total	

Special Event Descriptions

Volunteer Leadership Awards Luncheon

Tuesday, April 14 | 11:45 a.m. | Room: Steelcase Ballroom D
$80

Join us for a fun, fast-paced awards luncheon. Catch up with friends while AFS officers welcome four new board members. The AFS Technical and Management Division chairs will also present key national and divisional awards including the presentation of the Scientific Merit and Service Citation awards.

Annual Banquet

Tuesday, April 14 | Cashless bar reception 6 p.m. Amway Grand – Gerald Ford Room | Banquet 7 p.m. | President's After Party Amway Grand – Ambassador Ballroom | $150

Join us for business networking and the presentation of the highest AFS honor, the AFS Gold Medal. The cashless bar opens at 6 p.m. The awards presentation and banquet start at 7 p.m. The President's After-Party starts at 9 p.m. Recommended dress is business formal.

Women in Metalcasting Luncheon

Wednesday, April 15 | 11:45 a.m. | Room: Steelcase Ballroom D
Free to AFS members | $80 for Non-Members

This event is open to AFS members of Women in Metalcasting. It includes lunch, networking, the presentation of the AFS Women in Metalcasting Award for Excellence, and the presentation of the Jean Bye AFS Women in Metalcasting Scholarship. Non-AFS members will have to pay a fee of $80 to attend.

AFS Young Professionals Networking Reception

Wednesday, April 15 | 5 p.m. | No RSVP required
Room: River Overlook Pre-Function

You're Invited! Join the AFS Young Professionals and other industry professionals for a fun networking reception in the River Overlook at the DeVos Place Convention Center! Don't miss out – grab a drink and grow your network! We can't wait to see you there!

Alumni Dinner

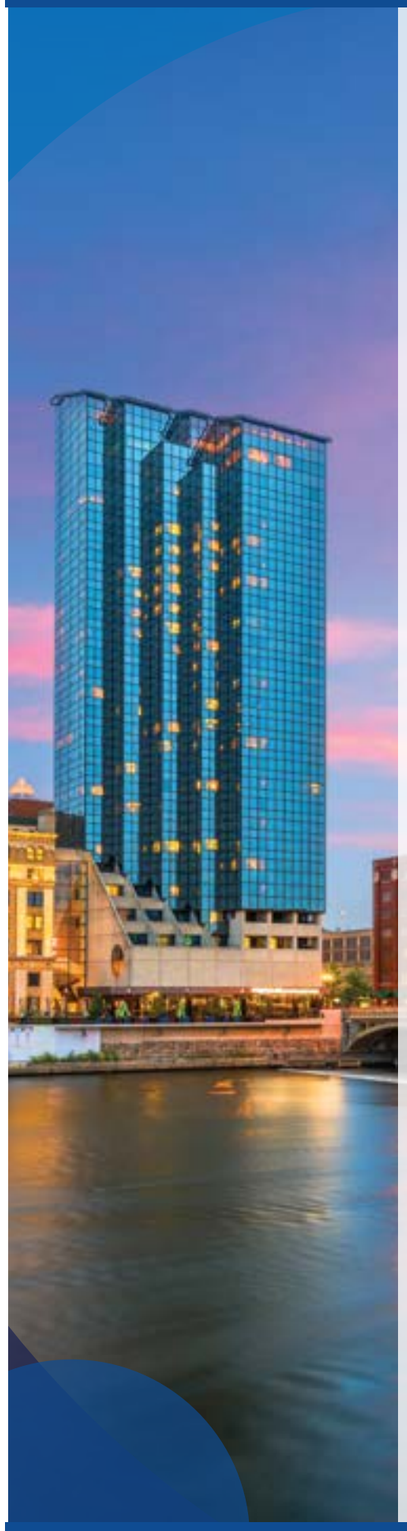
Wednesday, April 15 | 6 p.m. | Grand Rapids Public Museum
$145

Alumni will experience the Grand Rapids Public Museum, touring the special exhibits and permanent installations, while enjoying bold American cuisine. Must be a member of AFS Alumni to attend.

Copper Division Breakfast

Thursday, April 16 | 7 a.m. | Room: Steelcase Ballroom D | $70

The Copper Division Breakfast will feature a speaker of general interest from the Grand Rapids area and the Copper Division will present their annual awards. The breakfast is open to everyone with an interest in copper alloys.



About Our Host City

Grand Rapids, MI

Grand Rapids, Michigan is a city that will constantly surprise and delight you with authentic and unforgettable world-class experiences made easy, affordable and friendly. Grand Rapids exceeds expectations in every way.

Local Attractions:

Frederik Meijer Gardens & Sculpture Park

View modern sculpture in a stunning garden setting at this combination botanical garden and sculpture park, which features exotic plants, desert and Victorian gardens, wetlands, meadows, and sculptures by famous artists throughout.

John Ball Zoo

John Ball Zoo has over 2,000 animals including lions, tigers, chimpanzees, and red pandas, indoor and outdoor exhibits, an aquarium, interactive experiences, and so much more.

Gerald R. Ford Museum

Explore the life and times of Gerald R. Ford, Michigan's only President. Here documents, artifacts, photographs, and videos combine to tell the dramatic story of the Ford Presidency in the mid-1970s.

Grand Rapids Breweries

Consider exploring the Beer City Ale Trail, which boasts more than 80 breweries. Local and visitor favorites include: New Holland Brewing, Grand Rapids Brewing Co., and Founders Brewing Co.

2026 Show Schedule

Tuesday, April 14, 2026

7 a.m. – 5 p.m.

Room: *Grand Gallery*

Registration Open

7 – 8 a.m.

Room: *Galley Overlook GH*

Author/Chair Breakfast

This breakfast is for AFS speakers, session chairs, students and staff to meet and coordinate details for the day's educational sessions.

7:30 – 10:30 a.m.

Room: *Grand Gallery*

Coffee Station by AFS Technical Sessions

Sponsored By:

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8 – 9 a.m.

ADDITIVE MANUFACTURING DIVISION

Room: Grand Gallery D

Session Chairs: ***Kelley Kerns**, HA Group, Westmont, IL; **Jake Vargo**, Matthews Additive Technologies, Pittsburgh, PA*

Surface Roughness of Cast Steel Produced by 3D Printed Sand *(26-005)*

***Nathaniel Bryant**, University of Northern Iowa, Cedar Falls, IA; **Jerry Thiel**, Precision Casting Technologies LLC, Dysart, IA*

Castings produced using additively manufactured molds and cores typically exhibit rougher surface finishes due to an inherent limitation in the process. While improvements in surface roughness have been investigated in aluminum castings, little research was published in steel. To address this research gap, the University of Northern Iowa investigated ten commercially available 3D printing aggregates to understand the relationship between material parameters, refractory coating practice, and casting surface roughness. Similar trends to prior reports in aluminum castings were found, where a threshold value for material characteristics shows the limitation in further improvements in surface finish.

ADDITIVE MANUFACTURING DIVISION

Room: Grand Gallery D

Session Chairs: ***Kelley Kerns**, HA Group, Westmont, IL; **Jake Vargo**, Matthews Additive Technologies, Pittsburgh, PA*

High-Performance Hybrid Sand Cores via Binder Jetting: A Multi-Response Characterization and Optimization *(26-030)*

***Paoli Parenti, Mukul Kumar, Stefania Cacace, & Quirico Semeraro**, Politenico de Milano, Italy; **Maurizio Chiesa & Daniele Chiesa**, Fondershell srl, Italy*

This study investigates the performance of binder jetting (BJ) cores made from a silica-based sand mixtures, with the aim of optimizing the production of complex hydraulic components in cast iron. A wide range of printing experiments explores the impact of sand selection, reclamation, and rheology, as well as printing variables (such as build orientation and job box location) on the core properties and on their variability within the printer's build volume. Mechanical tests (flexural strength) and thermal expansion (hot distortion) are studied and coupled with casting trial outcomes that outline how the occurrence of veining, bending, and breakage defects can be minimized. Results reveal that variations in powder bed density and parameter-induced anisotropy significantly affect the multi-response performance. The research highlights critical process/property/performance links, enabling more uniform and predictable production of complex sand cores in industrial binder jetting scenarios.

ENGINEERING & SMART MANUFACTURING DIVISION

Room: Grand Gallery A

Session Chairs: ***Andrea McDermott**, A Y McDonald, Platteville, WI*

Casting Done Right Revisited *(26-092)*

***Paul Jones**, Huskerine Technologies, Rochester Hills, MI*

Collaborative designs of castings are critical to the success for casting users and casting producers. This paper describes how to achieve manufacturing friendly designs that satisfy customer requirements

Using Simulation to Drive the Rigging Process *(26-015)*

***David Schmidt**, Finite Solutions, Inc., Singer, WI*

Simulation has long been used to test rigging designs prior to casting production. This is useful, but it relies on the foundry engineer's expertise. However, simulation of a part without rigging can provide significant information that can be used to efficiently design an effective rigging system from the start. Simulation can then be used to verify and fine tune systems for highest yields. Case studies will be presented to illustrate how the process is applied to sand, investment and permanent mold casting processes. These examples will highlight the differences between casting alloys and processes and how those differences are accounted for in simulation.

MELTING METHODS & MATERIALS DIVISION

Room: Grand Gallery C

Session Chair: ***Todd Lyles**, Specialty Foundry Products, Inc., Ashville, AL*

Benefits of Fused Silica in Coreless Induction Furnace Dry-Vibratable Refractories *(26-010)*

***Griffin Patterson**, HWI, a Member of Calderys, Pittsburgh, PA*

Silica Dry-Vibes are one of the most common classifications of refractories used in coreless induction furnaces (CIFs). Quartz-based materials offer high refractoriness, excellent chemical resistance, and a good cost-performance balance. However, they are still prone to challenges such as sintering, erosion and thermal expansion. By incorporating fused silica into the quartz-based refractory, thermal expansion can be significantly reduced to improve furnace campaign life and improve operation flexibility. This paper investigates the scientific principles behind this phenomenon and presents case studies on how implementation of fused silica containing dry-vibes can improve number of heats in a campaign.

Events · Technical Track · Management Track · AFS Institute · Casting Designers & Buyers Track

Schedule is subject to change.

Schedule is subject to change.

8 – 9 a.m.

MELTING METHODS & MATERIALS DIVISION

Room: Grand Gallery C

Session Chair: ***Todd Lyles,*** *Specialty Foundry Products, Inc., Ashville, AL*

The Reduction of Slag Buildup on Refractory Linings in Ductile Iron Treatment Vessels *(26-052)*

Robert Pattillo & Mark Muszynski, *Reno Refractories, Inc., Birmingham, AL*

The buildup of slag on refractories results in costly repairs and downtime related to the removal of the buildup. This paper reviews the processes involved and possible solutions. A new refractory has been developed that essentially repels the micro/nano sized compounds suspended in molten iron. Electro-Static repulsion is employed in this system to prevent coagulation. The result is an improvement in operational efficiency.

METALCASTING RESEARCH

Room: Grand Gallery B

Session Chair: ***Adam Kopper,*** *Brunswick Corp., Fond du Lac, WI*

Smart Investment Shells for Foundry 4.0 *(26-113)*

Ben Hilgers, Laura Bartlett, Koustav Dey, Ronald O'Malley, & Jie Huang*, Missouri University of Science & Technology, Rolla, MO*

A novel in-line tool for automated production of aluminum investment castings is being developed. Advanced sensing techniques are being utilized to develop "smart" investment shells that can provide high-definition temperature and strain development maps during the shell manufacturing process, during dewaxing and firing, and during the aluminum casting and solidification process. This will enable the unprecedented ability to uniquely understand, control and eliminate process parameters that lead to defects during the shelling and firing process as well as provide unique information about filling parameters during the casting process such as metal velocity, temperature distribution, and ultimately microstructure prediction. In the current study, we present the use of fiber optic sensors to measure temperature and strain development during investment casting of 356 aluminum. This data can be directly be implemented into solidification modeling software improve casting quality.

Update on AFS Research Project Focused on Investment Casting Efficiencies Enhancements *(26-134)*

Jiten Shah, *Product Development & Analysis LLC, Naperville, IL*

This project started in 2023 with three primary tasks with goals to improve efficiencies by recycling of alumino-silica shell materials; evaluate new materials and processes for more rapid shell production with pattern burn out; and the generation of an improved tool for risering for common steel alloys. This presentation will provide an update with progress made till-date and future work by the project team consisting of California State Polytechnic University, Pomona; University of Northern Iowa, MetalTek/PDA LLC along with industrial partners. This AFS-led project is funded as part of AMC's Emergent Metal Casting Solutions (EMCS) program sponsored by the Defense Logistics Agency Troop Support, Philadelphia, PA and the Defense Logistics Agency Research & Development (R&D) Office, Ft. Belvoir, VA.

8 – 10 a.m.

AFS INSTITUTE

Room: Grand Gallery F

Metalcasting Process Basics - Part 1 *(26-136)*

Patrick Kluesner, *Grede Castings, Wauwatosa, WI*

This course provides participants with a basic overview of the metalcasting process. Students will trace the path of a casting from quoting through shipping.

8 a.m. – 5 p.m.

Room: Exhibit Hall B-C

Exhibitor Set Up

Schedule is subject to change.

9:15 – 10:15 a.m.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***Carl Soderhjelm, PhD,*** *University of California, Irvine, CA*

Arresting Transfer-Pour Velocities with Pour Basin Designs *(26-019)*

Daniel Hoefert, *Eck Industries, Inc., Manitowoc, WI;* ***Roy Stevenson,*** *MAGMA Foundry Technologies, Inc., Schaumburg, IL*

The focus of this paper is the investigation of pour basin designs that can help arrest the higher velocities involved with pouring larger transfer-pour castings. Filling simulations were used to compare several pour basin designs and trials were sampled using basins made via 3D printed sand. Video comparisons were recorded to document the pour quality and fill times were recorded to compare pour time consistency.

Multifrequency Ultrasonic Treatment of Liquid Al Alloys *(26-086)*

Raquel Fierro, *University of California- Irvine, Irvine, CA*

Multifrequency Ultrasonic Treatment (UST) is a novel molten Al processing method with potential benefits that replace the need for excessive chemical modifiers and tailor the microstructure of a solidified casting via control of the treatment conditions. UST has been known to refine grain size and modify intermetallic phases in the literature, however the mechanisms and conditions required to tune these microstructural alterations have not been sufficiently studied. This work establishes the mechanisms of UST; the critical conditions necessary to attain microstructural refinement in various Al alloys are quantified and presented. Experimental conditions including treatment time, treatment temperature, and time following treatment all play a role in optimizing microstructural refinement, which have been characterized via thermal analysis and electron microscopy.

LOST FOAM DIVISION

Room: Grand Gallery D

Session Chair: ***Jacob Belke,*** *Mercury Marine, Fond du Lac, WI*

Development of Quality-Focused Knowledge Base for the Lost PLA Casting Process *(26-021)*

Dr. Ismail Fidan, Vivekanand Naikwadi, & Mushfig Mahmudov, *Tennessee Technological University, Cookeville, TN;* ***Marshall Miller,*** *Tesserract4D, Rock Spring, GA*

This study explores a novel metal casting process using additively manufactured PLA patterns that disintegrate upon contact with molten aluminum, rather than being burned out beforehand. Key variables investigated include pattern shell thickness, coating types, and sand grain size. A full factorial Design of Experiment (DOE) was used to evaluate their effects on casting quality, assessed by surface roughness, dimensional accuracy, and hardness. Results showed that finer sand and white coating improved surface finish and hardness. Statistical analysis using ANOVA highlighted the influence of each parameter, while OM, SEM, and X-ray testing identified internal defects. Findings aid in optimizing casting quality.

Initial Investigation of Nickel Based Superalloys in Lost Foam and Additive Manufacturing Evaporative Casting *(26-124)*

Sarah Jordan & Mark DeBruin*, Skuld LLC, Piqua, OH;* ***Jason Walker & Pete Schupska****, The Ohio State University, Columbus, OH*

Nickel based superalloys such as nickel 625, 718, and 713c (also referred to as Inconels) are not typically used in lost foam. This America Makes project sought to demonstrate the feasibility of lost foam and Additive Manufacturing Evaporative Casting (AMEC), a new hybrid manufacturing process that merges polymer 3D printing with lost foam investment casting, to produce those alloys. The goal was to demonstrate the potential to use these processes for low volume, high end applications such as for forging tooling. This will cover the challenges and findings of the initial investigation in lost foam and AMEC.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

9:15 – 10:15 a.m.

MELTING METHODS & MATERIALS DIVISION

Room:
Grand Gallery C

Session Chair:
Ashley Folden-Ecker, *MPS Mankato LLC, Mankato, MN*

PANEL: Utilization of Quality Charge Materials in CorelessInduction Furnace Melting *(26-120)*

Leonard Basaj*, Metal Technologies Ravenna Ductile Iron Plant, Ravenna, MI;* ***Aaron Gowell****, Beacon Recycling, Inc., Muskegon, MI;* ***Ryan Sneddon,*** *EJ, Elmira, MI*

This panel session focuses on the selection and management of quality charge materials specifically for coreless induction melting. The panel includes representatives from a scrap supplier, a pig iron supplier, and a foundry with a coreless melting operation. The following topics will be covered: identifying and sourcing high-quality scrap, evaluating and specifying pig iron and other charge component, monitoring and testing the quality of raw materials, impacts of poor charge material quality on melt operations and casting outcomes, common issues encountered during the transition from cupola to coreless melting, supply chain challenges (current trends and outlook), strategies for building reliable supplier relationships, cost vs. quality considerations in material selection, and environmental and sustainability factors influencing material choices.

MOLDING METHODS & MATERIALS DIVISION

Room:
Grand Gallery A

Session Chairs:
Chris Lee, *Carpenter Brothers, Inc., Kalamazoo, MI;* ***Chuck Gerth****, Amsted Rail, Granite City, IL*

Assessing the Use of 3D Printed Patterns for Use in Investment Casting *(26-033)*

Amal Woolridge & Alan Druschitz*, Virginia Polytechnic Institute and State University, Blacksburg, VA*

Foundries commonly use wax to create patterns for investment casting. Wax use can lead to material waste and increase the time needed to produce parts, as wax patterns frequently need to be corrected, often by hand. Utilizing 3D printed patterns offers the opportunity to increase the precision of casts as well as reduce material waste, especially within smaller scale operations with custom patterns. Two filaments, Polylactic Acid and PolyCast, were compared. For this investigation, four patterns of differing shape and in-fill were printed using both filaments. Using the shell method of investment casting, a ceramic mold was created from the patterns. These molds were sintered and poured using grey iron. Throughout this process, the molds and final cast were observed to assess the differences between each type of filament and their viability for investment casting, with less damage observed on the PolyCast molds once the pattern was burned out.

Evaluation of Mullite Based Slurries for Steel Investment Casting *(26-055)*

Nicholas Costleigh & Nathaniel Bryant*, University of Northern Iowa, Cedar Falls, IA*

This paper presents a comparative study of zircon- and mullite-based slurry systems used in investment casting of steel. Traditionally, zircon is used in the primary slurry with fused silica as backup. At the University of Northern Iowa, trials were conducted using a mullite-based system for both primary and backup coats. The study outlines the formulation of the mullite slurry and evaluates its performance against zircon-based systems using key quality control metrics: Zahn cup viscosity, plate dip behavior, pH, and solids content. Casting trials were performed using both wax and 3D-printed bars, which were autoclaved, cast, and assessed for surface finish. Ping-pong ball dips were used to evaluate shell permeability, and preserved shell material was tested for compressive strength. This comprehensive testing regimen provides insight into the viability of mullite as a cost-effective and performance-competitive alternative to zircon in steel investment casting.

Schedule is subject to change.

10:30 – 11:30 a.m.

KEYNOTE

Room:
Steelcase Ballroom C

Nothing Can Stop You *(26-141)*

Jim Abbott, *Former Major League Baseball Pitcher and Olympic Gold Medalist*

Jim Abbott, a remarkable athlete and inspirational figure, delivers a powerful message of resilience, determination, and overcoming adversity. Born without a right hand, Abbott's journey to becoming a Major League Baseball pitcher is a testament to the human spirit's boundless potential. He also received a Gold Medal as an Olympian the first time baseball was an Olympic sport, and a University of Michigan Golden Spikes Award, the highest honor in college baseball.

His presentations are a blend of heartfelt storytelling, unwavering optimism, and a profound belief in the power of perseverance. His talk explores how do we learn to be grateful for the circumstances we are born into? And in the end, how we all can come to celebrate the challenges that make us who we are. Expect to be deeply moved and motivated as Abbott shares his experiences of defying the odds and achieving greatness in the face of challenges.

Abbott's approach is relatable and down-to-earth, emphasizing the importance of embracing differences, adapting to change, and never giving up on one's dreams. His talks transcend sports and touch on universal themes of courage, teamwork, and the potential that resides within all of us. His message resonates with audiences of all backgrounds, leaving a lasting impression that encourages individuals to strive for their personal best, regardless of the challenges they may face.

11:45 a.m. – 1:15 p.m.

EVENT

Room:
Steelcase Ballroom D

Volunteer Leadership Awards Luncheon
(Ticket Required)

Join us for a fun, fast-paced awards luncheon. Catch up with friends while AFS officers welcome four new board members. The AFS Technical and Management Division chairs will also present key national and divisional awards including the presentation of the Scientific Merit and Service Citation awards.

1:30 – 3 p.m.

ADDITIVE MANUFACTURING DIVISION

Room:
Grand Gallery D

Session Chairs:
Marshall Miller, *Tesserract4D, Rock Spring, GA;* ***Joe Hutto,*** *Howell Foundry LLC, Saint Francisville, LA*

Reducing Hot Tears and Hot Cracks using Sand-Embedded Lattice-Structured Printed Sand Molds *(26-011)*

Michael Tims, *Concurrent Technologies Corporation, Johnstown, PA;* ***Mihaela Nastac,*** *Arc Impact Acquisition Corporation Pittsburgh, PA;* ***David Rajewski,*** *Arc Impact Acquisition Corporation, Pittsburgh, PA*

Hot tears and hot cracks may form in castings when high tensile stresses are present. When the mold or core doesn't allow the casting to move freely, tensile stresses develop within the casting, which may lead to hot tearing or cracking. One method to deal with these conditions is to use lower-strength sand, which may be achieved using a sand-embedded lattice structure. Silica sand blocks having a regular pattern of through holes were printed and tested by applying a compressive load until the sand blocks ruptured. The lattice structures showed up to 89% reduction in mold compressive strength versus solid sand blocks. Aluminum (A206) I-beam castings were then made. Crack length was determined from x-ray images. The results showed crack length was controlled by lattice geometry and casting thickness. The findings demonstrate the ability of sand-embedded lattice structures to reduce or eliminate hot tears or cracks in castings.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

1:30 – 3 p.m.

ADDITIVE MANUFACTURING DIVISION

Room: Grand Gallery D

Session Chairs: ***Marshall Miller,*** *Tesserract4D, Rock Spring, GA;* ***Joe Hutto,*** *Howell Foundry LLC, Saint Francisville, LA*

Design Considerations for 3D Printed Sand Molds and Cores *(26-024)*

Dave Rittmeyer, *Matthews Additive Technologies, Pittsburgh, PA*

Are your 3D printed sand molds and cores taking full advantage of what the technology has to offer? Could your 3D printed sand molds and cores you are receiving be improved? There are many design considerations to take into account when designing your 3DPS items. Yes, some of the traditional limitations can be ignored, but there are many that applicable. From mold partings to latticing molds and cores. Multiple projects will be reviewed to show options of what can be designed into 3DPS molds and cores.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***David Weiss,*** *Vision Materials, Manitowoc, WI*

Machine Learning and Artificial Intelligence Image Analysis as a Diagnostic Tool for Aluminum 356 Casting Defects *(26-107)*

Jackson Piontek & Brian Began, *American Foundry Society, Inc., Schaumburg, IL;* ***Carl Soderhjelm,*** *University of California-Irvine, Irvina, CA*

A significant hurdle in solving casting defects is diagnosing them correctly. Often, foundries implement ineffective solutions to resolve defects because of an incorrect defect diagnosis. Many production hours can be wasted working on incorrect solutions with the problem being exacerbated as experienced foundry personnel and industrial subject matter experts who typically resolve these issues retire from the industry. A project was undertaken in hopes of creating a " defect app" to harness the capabilities of Machine Learning and Artificial Intelligence to automate defect diagnosis using imaging techniques commonly available to foundries. The project plan, scope, specifics, and status update will be presented and demonstrated. This Research is funded through the American Foundry Society, as part of the Aluminum Casting Performance Initiative, Emergent Metal Casting Solutions (EMCS) program, sponsored by the Defense Logistics Agency Information Operations, J68, Research & Development, Ft. Belvoir, VA and the DLA Troop Support, Philadelphia, PA.

The Influence of Alloy Scheil Factors on Skin Formation in High Pressure Die Casting *(26-008)*

Garrett Lange, *Missouri University of Science & Technology, Rolla, MO;* ***Jacob Belke,*** *Mercury Marine, Fond du Lac, WI*

In High Pressure Die Casting, a fine equiaxed and low-porosity surface layer called the skin often forms before transitioning to a coarser interior microstructure. Skin formation is often influenced by solidification time, heat transfer, and melt/die temperatures. However, a skin is not always observed even when the aforementioned factors are optimized to promote skin formation. This study explores how alloying elements, characterized by their Scheil factors, affect skin thickness. Fifteen binary aluminum alloys were created with elements spanning a range of Scheil values at 0.5 and 5 wt%, then gravity cast into a wedge-shaped copper die. The results showed more complex behavior than initially hypothesized and alternative skin-promoting element properties are discussed.

Schedule is subject to change.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***David Weiss,*** *Vision Materials, Manitowoc, WI*

Designing Structural Die Cast Aluminum Alloys from Automotive Twitch Scrap *(26-065)*

Gabriel Garcia, Michael Moodispaw, Jianyue Zhang, & Dr. Alan A. Luo, *The Ohio State University, Columbus, OH*

In this investigation, three secondary structural alloys with intermediate impurity contents (Fe~0.5-0.6%, Cu~0.3-0.5%) were designed with the purpose of competing with, and eventually replacing, primary alloys such as EZ-Cast C611 by achieving high elongations close to 10%. The alloys were labeled as RS-1, RS-2, and RS-3, with RS-1 and RS-3 containing lower impurity content (~0.5% Fe and 0.3% Cu) and RS-2 containing slightly more Fe and Cu (~0.6% and ~0.5%, respectively). The RS-3 alloy also contained a small addition of Ce (~0.15%). These alloys were die-cast and later tested in the as-cast condition, with these samples achieving elongations ranging from 7-9% with maximum elongations in some cases reaching between 9-10%. RS-2 also underwent a T7 heat treatment which led to an average elongation close to 10%, with the maximum elongation exceeding the goal of 10%.

CAST IRON DIVISION

Room: Grand Gallery C

Session Chair: ***Brad Steinkamp,*** *Charter Dura-Bar, Crystal Lake, IL*

PANEL: Thermal Analysis- Going Beyond C, Si and CE *(26-127)*

Erol Ergin, *Novacast USA, Naperville, IL;* ***Ramon Suarez,*** *Azterlan, Durango, Spain*

Spend some time with experts from the Cast Iron Division to see how you can take your molten metal to the next level. This panel will cover setup and maintenance of thermal analysis systems, how varying processes and techniques can impact results, obtaining and using baseline thermal analysis results for process controls, and the un-tapped potential most iron foundries are missing (going beyond carbon, silicon, and CE).

1:30 – 4:30 p.m.

AFS INSTITUTE

Room: Grand Gallery F

Metalcasting Process Basics - Part 2 *(26-136)*

Patrick Kluesner, *Grede Castings, Wauwatosa, WI*

This course provides participants with a basic overview of the metalcasting process. Students will trace the path of a casting from quoting through shipping.

3:15 – 4:45 p.m.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***Hideki Gebken,*** *Standard Manufacturers Services Limited, Winnipeg, Manitoba, Canada*

Seasonal Impacts on the Artificial Age Response of Aluminum Castings Made in the Precision Sand Casting Process (PSCP) *(26-094)*

Robert Mackay & Glenn Byczynski, *Nemak, Ontario, Canada*

Artificial Aging (AA) is an important post-casting process which brings about the required mechanical properties, hardness and dimensional stability required for vehicle applications. Most AA development for aluminum castings centers around both the strict control of the door-to-door duration, and tight adherence to target temperatures, both of which help meet the required material properties. However, the consistency of the ramp up to target temperatures, and then ramp down to room temperature, can play a role in the consistency of the mechanical property response. If the cooling down stage is done via fans which draw the air from outside, this could mean that seasonal effect on mechanical properties could be encountered. Consistency of the entire thermal path for the AA process is a critically important aspect which can support improved process optimizations and enhance the development of the Failure Mode Effects Analysis (FMEA) process, a requirement for metal castings and their subsequent heat treatment for automotive applications.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

3:15 – 4:45 p.m.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***Hideki Gebken,*** *Standard Manufacturers Services Limited, Winnipeg, Manitoba, Canada*

Strategy for Chill Implementation in the Precision Sand Casting (PSCP) for Automotive Applications *(26-095)*

Robert Mackay & Glenn Byczynski, *Nemak, Ontario, Canada*

The Precision Sand Casting Process (PSCP) is used to manufacture components in many Internal Combustion Engine (ICE) and Battery Electric Vehicle (BEV) applications. PSCP competes mainly with High pressure Die Casting (HPDC) and Gravity Semi-permanent Mold (GSPM) as they can manufacture the same type of products for the automotive space. In recent years the implementation of a chill in PSCP has refined the microstructure in targeted areas, which in turn improves both tensile and fatigue properties, potentially giving it a performance boost over the competing casting processes mentioned. However, chill implementation can have other drawbacks that can impact other parts of the final casting adversely. This work outlines the impact on the PSCP with a chill, and without a chill, on the casting's overall characteristics and heat treat response. From there the authors will compare the possibilities with the PSCP against competitive casting processes for the same automotive applications.

CAST IRON DIVISION

Room: Grand Gallery C

Session Chairs: ***Eric Nelson,*** *Eric Nelson Consulting LLC, Mankato, MN;* ***Angella Sell,*** *Aalberts Surface Technologies, Livonia, MI*

Effects of Carbon Equivalent, Nodularity, Inoculation, Spruce Height, Risering Conditions and Pouring Temperature on Wall Movement and Porosity Formation in Ductile Iron Castings *(26-064)*

Noah Brack, Shamsul Alam, Mingzhi Xu, & Jingjing Qing, *Georgia Southern University, Statesboro, GA;* ***Simon Lekakh,*** *Missouri University of Science & Technology, Rolla, MO*

During the solidification and cooling of ductile iron, multiple phase changes occur, resulting in dynamic volume changes and exerting pressure on mold walls and internal cavities. Such pressure can deform mold walls and casting surfaces, resulting in swell and porosity defects. In addition, this pressure can also affect the shrinkage formation. This study aims to expand on previous work studying expansion and contraction of ductile iron during solidification and cooling by considering the effects of variables such as sprue height, risering, and pouring temperature on wall movement and porosity formation using a real-time wall movement measuring apparatus and image analysis of porosity.

Effect of In-mold Al, Ti and Ca Additions on Austenite Morphology, Grain Size and Mechanical Properties of Nickel-Alloyed Ductile Iron *(26-074)*

Adnan Adib Ahamed, Jingjing Qing, & Mingzhi Xu, *Georgia Southern University, Statesboro, GA*

This research investigates the impact of in-mold additions of Al, Ti and Ca on the austenite morphology, grain size and mechanical properties of nickel-alloyed ductile iron. A hypoeutectic alloy with primary austenite phase was designed using thermodynamic calculations. Different alloying additions were placed into separate molds prior to the pour and the castings with various additions were produced for assessing their impact on the macrostructure, microstructure and tensile properties. Macrostructural analysis revealed the austenite grain structure. Microstructural examination with a scanning electron microscope (SEM) equipped with energy dispersive X-ray and automated feature analysis was used to classify the non-metallic inclusions dispersed in the matrix of the cast samples. Thermal analysis was utilized to reveal the solidification characteristic temperatures and tensile tests were performed. The results indicated effects of different additions on the austenite grain structure and resultant impacts on the mechanical properties of the nickel-alloyed ductile irons.

Schedule is subject to change.

CAST IRON DIVISION

Room: Grand Gallery C

Session Chairs: ***Eric Nelson,*** *Eric Nelson Consulting LLC, Mankato, MN;* ***Angella Sell,*** *Aalberts Surface Technologies, Livonia, MI*

Mutual Effects of Boron, Cooling Rate and Graphite Nodule Dispersion on Austenite Transformation in Pearlitic Ductile Iron *(26-087)*

Colleen Lehrer, Dr. Laura Bartlett, & Simon Lekakh, *Missouri University of Science & Technology, Rolla, MO*

Boron is known to promote ferrite in spheroidal cast irons. The mechanism is unclear. Traditional characterization of the eutectoid transformation via in-mold continuous cooling has limitations because cooling rate and solidification structure are related. Therefore, dilatometric investigations were performed under controlled cooling for known dispersions of graphite nodules. Laboratory cast pearlitic Cu-alloyed SGI solidified with varying section thicknesses was investigated for sensitivity to boron contamination up to 60 ppm. Graphite dispersity of as-cast condition was determined for dilatometry specimens, which were austenitized at 1000°C and subjected to controlled cooling at different rates through the eutectoid transformation. Quantitative analysis of microstructure and dilatometric curves were used to characterize the mutual effects of boron contamination, cooling rate, and solidification structure. These results could be used in future to optimize casting processes.

MOLDING METHODS & MATERIALS DIVISION

Room: Grand Gallery A

Session Chairs: ***Liam Miller,*** *American Colloid Co., Hoffman Estates, IL;* ***Pete Gravunder,*** *Badger Mining Corp. Berlin, WI*

The Case for a Faster Methylene Blue Clay Test *(26-027)*

Brian Rachwitz, *Saginaw, MI*

The MB clay procedure, as recommended by Centre Technique des Industries de la Fonderie (CTIF), has been used for many years by European foundries. This test provides significantly faster test results than the current standard AFS Methylene Blue clay tests, without sacrificing any accuracy. This presentation will focus on the background of the test and present a case for acceptance of a new procedure utilizing these techniques.

SILVER ANNIVERSARY LECTURE: Visualization of the Thermal Distortion of Disc-Shaped Chemically Bonded Sand Specimens for Al Developments *(26-037)*

Dr. Sam Ramrattan, *Western Michigan University, Kalamazoo, MI*

Chemically bonded sand cores and molds are an important part of metal casting technology, and the mold-metal interface is of great technical interest to the industry. The metal casting industry has been placing a strong emphasis on near-net-shape and thin wall castings, while simultaneously maintaining increasingly stringent dimensional reproducibility requirements. The Thermal Distortion Test (TDT) has proven to be an effective laboratory testing methodology for measurement of distortion in chemically bonded sand-binder specimens, and to determine the presence of undesired casting features for more than twenty-five years. This paper presents a 3D visualization tool that can assist design engineers in deeper comprehension of thermal deformation characteristics of the sand binder system throughout the casting process. Specific benefit to foundry engineers is 3D graphical visualization of the deformation at various temperature and head pressure.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

3:15 – 4:45 p.m.

STEEL DIVISION

Room:
Grand Gallery D

Session Chair:
Mark Osborne,
Wabtec, Haslet, TX

Steel Thermal Analysis: A Review *(26-105)*

Dr. Robert Tuttle, *Western Michigan University, Kalamazoo, MI*

Thermal analysis of steel has a long history of development. This paper presents a basic introduction to the technique and its historical development. The author reviews current challenges with the technique and where research must be done to improve it. Additionally, future applications that will have the greatest impact on foundry process control are outlined.

Characterization of Laser Micro Welds in Steel Castings *(26-076)*

Allan Woldow, Dr. Laura Bartlett, Mario Buchely, Elias Snider, & Ming Leu, *Missouri University of Science & Technology, Rolla, MO;* ***Jim Barlow,*** *Caterpillar, Inc., Mapleton, IL*

The effect of laser welding as a repair method of small casting defects, and the microstructural and hardness response to this repair in a steel casting, was investigated. Y-Blocks of SAE 8630 steel were produced though melting of the alloy constituents in a coreless induction furnace and subsequent pouring into resin-bonded sand mold keel blocks. The keel blocks were then quenched and tempered to provide a tempered martensite microstructure. Blocks were then sectioned into test coupons for laser welding and analysis. Various welding parameter sets were used to produce welds which were evaluated by means of micro-CT scanning, microscopy, and microhardness. This data was used to generate idealized parameter sets for future mechanical testing work to ultimately understand the overall effect of laser welding on cast steel products. In addition to evaluating the as-welded structure, tempering studies were conducted to determine if tempering would be a value-added process.

Tensile and Fatigue Analysis of Laser 'Micro' Welds in Steel Castings *(26-077)*

Allan Woldow, Elias Snider, Laura Bartlett, Mario Buchely, & Ming Leu, *Missouri University of Science & Technology, Rolla, MO;* ***Jim Barlow,*** *Caterpillar, Inc., Mapleton, IL*

The effect of laser welding as a repair method for small casting defects, and the microstructural and hardness response to this repair in a steel casting, was investigated. Y-Blocks of SAE 8630 Steel were produced through melting of the alloy constituents in a coreless induction furnace and subsequent pouring into resin-bonded sand mold keel blocks. The keel blocks were then quenched and tempered to provide a tempered martensite microstructure. Blocks were then sectioned into tensile bars and fatigue bars for mechanical testing. This testing was designed to determine how detrimental laser welding could be on mechanical properties and to determine if laser welding is a viable repair method. Fractography of the broken fatigue bars was used to provide insight into the initiation of the failure to determine if it was related to the welding process. Post weld tempering also explored to view any potential property increase compared to as-welded.

6 – 7 p.m.

Room:
Amway Grand - Gerald Ford Room

Annual Banquet Reception
(Cashless Bar)

Join us for a memorable evening with friends new and old. The cashless bar opens at 6 p.m.

Schedule is subject to change.

7 – 9 p.m.

Room:
Amway Grand - Ambassador Ballroom

Annual Banquet
(Ticket Required)

Join us for business networking and the presentation of the highest AFS honor, the AFS Gold Medal. ¬ The cashless bar opens at 6 p.m. ¬ The awards presentation and banquet start at 7 p.m. Th¬e President's After-Party starts at 9 p.m. Recommended dress is business formal.

9 – 10 p.m.

Room:
Amway Grand - Ambassador Ballroom

President's After-Party
(Cashless Bar)

Network with your industry peers at this fun capstone to the evening.

Wednesday, April 15, 2026

7 a.m. – 5 p.m.

Room:
Grand Gallery

Registration Open

Lanyards sponsored By:

sinto

7 – 8 a.m.

Room:
Galley Overlook GH

Author/Chair Breakfast

This breakfast is for AFS speakers, session chairs, students and staff to meet and coordinate details for the day's educational sessions.

7:30 – 10:30 a.m.

Room:
Grand Gallery

Coffee Station by AFS Technical Sessions

Sponsored By:

Anderson Foundries · Andromat · FORTE Tooling Technologies — Patterns • Molds • Core Boxes

Events · Technical Track · Management Track · AFS Institute · Casting Designers & Buyers Track

Schedule is subject to change.

8 – 9 a.m.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***Luke Schimmel,*** *Fairbanks Morse Defense, Brodhead, WI*

New Approaches to Nano-Composite Production *(26-135)*

David Weiss, *Vision Materials, Manitowoc, WI*

Distribution of nanocomposites in molten aluminum is always an issue. The particles tend to cluster, and once clustered are difficult to de-agglomerate. As important are the changes to the bulk alloy as wetting elements are pulled from the matrix, requiring chemistry adjustments. This presentation looks at new techniques to mitigate clustering and quantifies chemistry changes to retain proper response to heat treatment.

Effect of Solution Heat Treatment Time on A356-T6 Static and Dynamic Properties *(26-101)*

David Weiss, *Vision Materials, Manitowoc, WI*

It is well known that the heat treatment of most aluminum alloys has a direct impact on both the static and dynamic properties of the materials, yet considerable latitude is allowed on the solution time guidelines given in various references. For A356-T6, the time suggested at the solution temperature (1000 F) in the Aluminum Association's Standards for Aluminum Sand and Permanent Mold Castings is given at between four and twelve hours depending on product form. Most specifications allow for this if static mechanical property requirements are met. This project considered fatigue performance over a range of solution times where fatigue performance is important, along with potential methods to monitor completion of the solution cycle. The results suggest that the solution time has some impact on fatigue properties and revealed that other factors, such as Si modification and quench delay can also have important effects.

CAST IRON DIVISION

Room: Grand Gallery C

Session Chair: ***David Gilson,*** *SinterCast, Inc., Pewaukee, WI*

CAST IRON HONORARY LECTURE: Changes/Lessons learned in the NA Cast Iron Industry from the 80's to Present *(26-143)*

Robert Logan, *Elkem Silicon Products, Ontario, Canada*

Since the 1980's the North American Cast Iron Industry has evolved significantly. In this lecture, the presenter will dive into some of the industry changes and share some lessons learned during the past 5 decades. This will include but may not be limited to; A Macro look at the Industry, Foundries and Locations, Raw materials/Melting, Metallurgy - Treatment and Inoculation of iron, Change and Business Management.

ENVIRONMENTAL, HEALTH & SAFETY DIVISION

Room: Grand Gallery E

Session Chair: ***Tom Slavin,*** *Slavin Osh Group LLC, Chicago, IL*

PANEL: EHS Hot Topics *(26-133)*

Air Quality:
Jeet Radia, *McWane, Inc., Birmingham, AL*

Water, Waste & Byproducts Management:
Dan Plant, *Metal Technologies, Auburn, IN*

Safety & Health:
Mickey Hannum, *McWane, Inc., Birmingham, AL*

Updates from the EHS Committees.

Schedule is subject to change.

MOLDING METHODS & MATERIALS DIVISION

Room: Grand Gallery A

Session Chairs: ***Pete LeBlang, Betz Industries,*** *Grand Rapids, MI;* ***Brian*** *Rachwitz, Saginaw, MI*

Cold-Box Core Production Process Optimization Using Simulation *(26-035)*

Thomas Brandt & Peter Blaser, *CPFD Software, Houston, TX;* ***John Letts,*** *LAEMPE REICH, Trussville, AL*

Simulation of metal flow and solidification processes is well established in the metal casting industry. In recent years there have been numerous attempts to expand metal flow software to capture sand flow behavior. This presentation introduces Arena-flow, custom foundry simulation software that computes the air-driven sand motion central to the blowing/shooting and curing of sand cores and molds, and how it is used to optimize design, equipment, and process considerations. Concepts are illustrated using a case study from a North American foundry undergoing a conversion from green-sand molding to cold-box cores and molds. The Laempe Reich team presents their work and experience including how simulation was used to optimize processes and cores that were "right the first time". Guidance is provided for OEMs, foundries, and core/patterns shops seeking similar outcomes.

Transforming Green Sand Management with AI and Industry 4.0 *(26-044)*

Deepak Chowdhary & Rahul V, *MPM Infosoft Pvt. Ltd., Maharashtra, India;* ***Chris Kelly,*** *Cadillac Casting, Inc., Cadillac, MI*

Green sand system control is challenging due to interdependent parameters, job-mix variations, and limited real-time data. Traditionally reliant on domain experts, sustaining this expertise is increasingly difficult with today's high workforce turnover and growing quality demands. This paper presents the joint implementation of an AI-driven green sand optimization platform at Cadillac Casting Inc. (CCI), as part of its Industry 4.0 initiative. The system combines real-time data acquisition, advanced analytics, and AI to monitor, correlate, predict, and optimize key sand parameters. By modelling property interdependencies and simulating return sand characteristics, it prescribes dose-by-need additives to maintain optimal sand parameters. This digital transformation has shifted CCI's approach from reactive troubleshooting to proactive, predictive management improving process consistency, and embedding data-driven decision-making. The case study demonstrates AI's potential to address persistent sand control challenges and strengthen operational resilience.

STEEL DIVISION

Room: Grand Gallery D

Session Chair: ***Laura Bartlett,*** *Missouri University of Science & Technology, Rolla, MO*

Clean Steel Castings at Ultralow Pouring Temperatures for High Performance Applications using the Innovative ROTOCLENE Process and HOLLOTEX Shroud *(26-025)*

David Hrabina, *Foseco International Limited, UK*

Tapping molten metal to the pouring ladle causes metal splash and re-oxidation forming non-metallic inclusions. This paper describes a ceramic rotor treatment creating a curtain of fine argon bubbles swirling through metal which lifts inclusions up and homogenizes the temperature of the metal throughout the ladle and allows desulfurization by stirring under synthetic slag. HOLLOTEX Short Shroud protects the clean steel from re-oxidation and air entrainment during the casting process. Positioned in a metallic coupling set, it creates a sealed pressurized path from the Nozzle, via standard ceramic downsprue to the choke located in the diverter under the casting. A diverter distributes non-pressurized metal through the ceramic gating system into the mold cavity. Significant quality and productivity improvements are achieved due to the elimination of oxide and bifilm formation, improved surface quality of the castings, significant reduction of X-ray, MPI and ultrasonic detected defects.

8 – 10 a.m.

AFS INSTITUTE

Room: Grand Gallery F

Preview: Introduction to Supervisor Development *(26-138)*

Patrick Frazier, *ME Global, Inc., Tempe, AZ*

Introduction to Supervisor Development is beneficial to those who have been recently promoted from hourly or salaried ranks who have little previous experience in supervision.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

9 a.m. – 6 p.m.

Room: Hall B-C

Exhibit Hall Open

9:15 – 9:45 a.m.

CASTING DESIGNERS & BUYERS

Room: Casting Source Theater

Session Chair: ***Kim Phelan,*** *American Foundry Society, Inc., Schaumburg, IL*

Project RCP-COE: Simplifying DOD Casting Requirements for the Foundry *(26-119)*

Brian Began, *American Foundry Society, Inc., Schaumburg, IL;* ***Donald Deptowicz,*** *Renaissance Services, Berthoud, CO*

This presentation will report on the status of a pilot program for the "Rapid Cast Parts – Center of Excellence" (RCP-COE). The project, which runs from September of 2025 until October of 2026, allows participating foundries, with or without full DOD supplier credentials, to be a casting supplier to the DOD. The presentation will advise on the project's efforts to date, discuss specifics on how and why to get involved, cite examples of challenges that needed to be overcome within the program in supplying DOD castings, and discuss the program and emerging program futures.

9:15 – 10:15 a.m.

ALUMINUM & LIGHT METALS DIVISION

Room: Grand Gallery B

Session Chairs: ***Mark Osborne,*** *Wabtec, Fort Worth, TX*

Measuring the Effective Heat Transfer Coefficients at the Mold-Metal Interface in a Sand Casting for the Purpose of Solidification Modeling *(26-013)*

David Levasseur, Gheorghe Marin, & Franco Chiesa, *Centre de Metallurgie du Quebec, Quebec, Canada;* ***Jimmy Simard,*** *Quebec Metallurgy Center*

Using a reliable value for the interfacial heat transfer coefficient (HTC) at the sand-metal interface for the purpose of modeling the filling and solidification inside a mold is a recurrent problem. Numerous tests for simple geometries showed that HTCs vary during filling and solidification. The interfacial heat exchange involves phenomena (evaporation/cracking of the binder) which cannot be practically modeled, so that an "effective" value of IHTC is usually defined. For this reason, the "effective value" should be determined in-house for the conditions of a given foundry. In this paper, a method is demonstrated on a magnesium ZE41A casting; 12kg (26lb) poured metal, 6kg (14lb) trimmed casting, using the response of 4 thermocouples located in selected risers of the cast cluster.

Manufacturing of A356 Alloy Ring in SGT-600 Gas Turbine with High Tensile Properties *(26-059)*

Ramin Ajdar, *University of Toronto, Ontario, Canada;* ***Faraz Shirazi & Roya Shahedi,*** *Middle East Industrial Gas Turbine, Tehran*

In SGT-600 Siemens gas Turbine there is a A356 alloy ring which has high mechanical properties. The manufacturing process of the ring during sand casting and T6 heat treatment has been discussed. The Siemens standard is minimum 230 MPa for U.T.S and 190 MPa for Y.S. The ultimate tensile strength of this alloy is inversely depended on the dendrite arm spacing (DAS), therefore the grain refinement and modifying silicon morphology is conducted to decrease the DAS. The grain refinement of Al phase is performed utilizing Al-5Ti-B master alloy in the amount of % 0.6 and modifying silicon morphology is conducted by adding % 0.5 strontium. The Mg2Si particles percentage and distribution are directly impacted on the yield strength. This is achieved by T6 solution heat treatment at 1004F(540C) for 8 hours following by aging ar 308F(153C) for 10 hours. The surface quality of the ring after penetration test is approved.

9:15 – 10:15 a.m.

CAST IRON DIVISION

Room: Grand Gallery C

Session Chair: ***Kramer Pursell,*** *Metal Technologies Auburn Casting Center, Columbia City, IN*

Thermal Analysis for Gray Iron: A Reliable Tool for Tensile Strength Predictions for Cupola and Coreless Melting *(26-007)*

Leonard Winardi, *Charlotte Pipe & Foundry Co., Oakboro, NC*

Accurate prediction of tensile strength is essential in iron foundry. Traditional chemistry-based models, such as the Alloy Factor and Carbon Equivalent (CE), often fail to capture solidification effects and graphite nucleation, which strongly influence mechanical properties. Thermal Analysis (TA), which interprets cooling curve behavior, offers a faster, more accurate alternative. This study compares Alloy Factor and TA methods using production data from both cupola and coreless induction furnaces. TA relies on three key parameters—ACEL, TELOW, and GRF2—that reflect composition and graphite morphology, collectively explaining over 80% of strength variation. Prediction performance was evaluated using a failure criterion: predicted UTS higher than actual, or underprediction greater than 2,500 psi. TA reduced failure rates from 19% to 2% in cupola operations and from 28% to 2% in coreless melting. These results highlight TA's superior accuracy and practicality for real-time tensile strength prediction in gray iron foundries.

Increasing Ductile Iron Melt Cleanliness, Yield and Fluidity by Avoiding Oxide Formation during the Melting Process *(26-084)*

Shelly Dutler, Jared Kerker, Gaylan Beasley, & Peter Strothkamp, *Refractory & Insulation Supply, Eldridge, IA*

A manufactured, charge mix compatible aggregate introduced during ductile iron melting has been shown to reduce slag weight and increase fluidity without changing the ratio of returns, type of steel materials or increasing pig iron. Controlling oxygen during the ductile iron melting process results in less slag and improved slag consistency which increases the ease of removal. This reduces the operator's time around the furnace and furnace downtime for slag related cleaning and repairs. In addition, a cleaner melt as defined by fewer oxide inclusions in the liquid iron promotes increased fluidity. These improvements were proved in controlled variable foundry lab experiments and industrial scale trials and assessed with quantitative and qualitative measurements.

ENGINEERING & SMART MANUFACTURING DIVISION

Room: Grand Gallery A

Session Chair: ***Francois Audet,*** *Foundry Solutions Metallurgical Services Inc., Capitale-Nationale, Quebec, Canada*

TBA

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

9:15 – 10:15 a.m.

MELTING METHODS & MATERIALS DIVISION

Room:
Grand Gallery D

Session Chair:
David Kasun, *ATD Engineering & Machine, Au Gres, MI*

Cupola Efficiency Benchmarking and Scope 1/2 Emissions Determination *(26-122)*

Chris Rostad, *Kuttner North America, Port Washington, WI*

The determining factors of cupola efficiency will be reviewed and the method for calculating TPK efficiency benchmarking will be presented. A logical method to accurately calculate Scope 1 and Scope 2 CO2 emissions will also be presented. This will give consideration to fuel properties, energy inputs from pollution control system and prime movers, as a function of cupola metal throughput (tph). The concept of carbon sequestration (metallurgical carbon pickup in the cupola) and how to account for this (LCA of cast iron) will be discussed.

Two Paths to Cupola Decarbonization: Increased Process Efficiency & Carbon Neutral Fuels *(26-123)*

John Gatewood, *ATD Engineering & Machine, Au Gres, MI*

The primary path to maximizing cupola efficiency is via fuel reduction through cupola equipment and process optimization. The technical factors that affect efficiency will be presented along with descriptions how to optimize them. The secondary path (extremely significant) is through the use of carbon-neutral cupola fuels/alloys. Some examples of how this is done will be presented. Since there are currently no significant regulatory pressures in the US to decrease GHG/CO2 emissions, we will present some specific, successful case studies in other countries and regions (with strong decarbonization policies), where tremendous carbon footprint reduction success has been realized through the use of carbon-neutral/non-fossil fuels.

WOMEN IN METALCASTING

Room:
Grand Gallery E

Session Chair:
Maddie Wilson-Smith, *Pittsburgh Foundry & Machine Co., Derry, PA*

Navigating Burnout with Resilience *(26-130)*

Sabrina Moon, *Problem Solving Institute, LLC, Chicago, IL*

This interactive, one-hour session blends real-world manufacturing insights with research-based tools for managing stress, fostering reflection, and enhancing emotional resilience. Participants will explore:

- The top three burnout triggers in manufacturing and operations environments
- Practical strategies to strengthen resilience at work and at home
- Tools to support well-being, self-reflection, and emotional regulation
- Actionable handouts with practical takeaways

Thank you to our Women in Metalcasting Luncheon Sponsors:

9:45 – 10:30 a.m.

CASTING DESIGNERS & BUYERS

Room:
Casting Source Theater

Session Chair:
Kim Phelan, *American Foundry Society, Inc., Schaumburg, IL*

Update on AFS Project for Digitizing Various Knowledge Platforms *(26-009)*

Brian Began, *American Foundry Society, Inc., Schaumburg, IL*

This presentation is on AFS's efforts to improve the digital accessibility and operability of its various knowledge platforms. This project has already yielded AFS Library enhancements such as the Liberty Link app, the "My Catalog" feature, library tutorials, and the AFS Library Enhanced AI Search Tool, as well as an improved storefront and webnar platform. This third installment presentation will focus on recent enhancements of the aforementioned, as well as provide updates on CADS and other derivative service enhancements including live demonstration of the brand new AFS E pubs platform targeted for launch in April 2026. Ultimately, it will highlight the various exciting ambitions with projected timelines of the ongoing AMC Emergent Metal Casting Solutions (EMCS) project, funded by the Defense Logistics Agency (DLA) and AFS under the project title "Virtual Knowledge Transfer Platforms for Improved Access to Metalcasting Best Practices".

10:30 – 11:30 a.m.

HOYT MEMORIAL LECTURE

Room:
Steelcase Ballroom C

Foundry Manufacturing: Where Metallurgy Meets Mastery
Exploring the Dual Nature of Casting as Both Art and Science and its Unique Place in Manufacturing Technologies (26-097)

Randall Oehrlein, *Carley Foundry, Blaine, MN*

Foundry processes represent a unique intersection of art and science, blending precision engineering with creative problem solving. The science aspect is evident in metallurgy, thermodynamics and fluid mechanics, which dictate material behavior, casting integrity and defect prevention. Simultaneously the artistic dimension emerges in mold design, pattern-making, and the nuanced expertise required to manipulate molten metal into complex high-quality components. Mastery in foundry operations requires both empirical knowledge and intuitive craftsmanship, as professionals navigate variables such as material composition, cooling rates and intricate geometries. This synthesis of technical rigor and creative adaptation underscores the essential duality of foundry work, making it a field where science ensures reliability, while artistry refines excellence. This paper looks at the nature of manufacturing and how the foundry industry has, and will continue to, straddle science and art.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

11:45 a.m. – 1:15 p.m.

EVENT

Room:
Steelcase
Ballroom D

Women in Metalcasting Luncheon

This event is open to AFS members of Women in Metalcasting. It includes lunch, networking, the presentation of the AFS Women in Metalcasting Award of Excellence, and the presentation of Jean Bye AFS Women in Metalcasting Scholarship.

Thank you to our Women in Metalcasting Luncheon Sponsors:

11:45 a.m. – 12:45 p.m.

Room:
Casting Source
Theater

IJMC/FEF Student Research Competition

The IJMC/FEF Student Research Competition empowers undergraduate college students to showcase their metalcasting research projects at CastExpo. Winners will earn scholarships and be published in the International Journal of Metalcasting!

1 – 1:25 p.m.

SPONSORED PRESENTATION

Room:
Casting Source
Theater

Foundry Planning: More than Just the Sum of Machines and Processes

Huub van der Weiden, *GEMCO Cast Metal Technology, The Netherlands*

Gemco stands for 50 years of independent foundry consulting and engineering expertise and 1500+ foundry projects realized worldwide. How independent engineering translates into the best performing, customized foundry system. From concept and feasibility, through system integration and interface engineering, to implementation and performance. Gain insights into the accumulated knowledge of castings markets, cast products and metal casting, -applied, tested, and proven- through generations of consulting, engineering, and implementation projects in the foundry industry.

Schedule is subject to change.

1:30 – 3 p.m.

ENVIRONMENTAL, HEALTH & SAFETY DIVISION

Room:
Grand Gallery C

Session Chair:
Brent Charlton,
Metal Technologies Corporate Center, Auburn, IN

Safety Improvement on the Red Zones Thanks to Smart Robotics *(26-029)*

Diego Soares, *POLYTEC NORTH AMERICA, Sorocaba, São Paulo, Brazil*

A newly developed robotics range, designed specifically for induction furnaces automates the sampling and other functions, ensuring precise and consistent results while safeguarding operators from direct exposure to the high-temperature environment. Equipped with optional pouring and deslagging tool, the sampling robot provides foundries with a reliable and safe alternative for slag removal, reducing manual intervention and associated risks. As foundries face increasing demands for safer and more efficient processes, proven robotics technology make it a trusted partner for advancing operational standards.

Best Practices for Bag Leak Detection Systems in Clean Air Act Permitting *(26-068)*

Caleb Swanson & Vahid Mirsaidi, *Auburn FilterSense LLC, Beverly, MA*

Due to heightened concern in environmental control, pollution of our environment has become an increasingly important problem. The United States Environmental Protection Agency (EPA) has implemented rigorous regulations for improving air quality by controlling the emission of pollutants from stationary sources such as steel mills, smelters, and foundries. These industrial processes plants in the United States face the burden of operating Bag Leak Detection System after each fabric Filter baghouse. This presentation recommends best practices for the installation and operation of BLDS monitors used for compliance with Clean Air Act (CAA) requirements. These best practices are for consideration in CAA permitting actions involving fabric filter control devices. The best practices discussed herein are more suitable for triboelectric, charge induction BLDS monitors.

A Simple Guide for Dealing with Citations *(26-100)*

Brian Bigley, *Pittsburg State University, University Park, IA*

A Simple Guide for Dealing with Citations" is a quick primer for beginners in the Conference/Contestment process. Conferencing your citation is the first step in any situation where you believe your company has been wrongfully or incorrectly cited. It is a process that runs alongside Contesting a citation. We will discuss the difference between the two processes, and how to prepare for both, as you proceed with the typical first step, a conference.

ENGINEERING & SMART MANUFACTURING DIVISION

Room:
Grand Gallery A

Session Chair:
Zach Meadows,
Electric Controls & Systems, Birmingham, AL

PANEL: Melting Choices - Evaluating Cupola and Induction in Today's Foundry Landscape *(26-082)*

David Kasun, *ATD Engineering & Machine LLC, Au Gres, MI;* ***Robert Keshecki,*** *Inductotherm, Rancocas, NJ;* ***Sahil Makwana,*** *Bingham & Taylor Corp., Culpeper, VA*

This session is designed to help foundries make informed decisions about furnace investments and operations based on their unique regional, regulatory, and supply chain circumstances.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

1:30 – 3 p.m.

GOVERNMENT AFFAIRS DIVISION

Room: Grand Gallery B

Session Chair: ***TBA***

TBA

METALCASTING RESEARCH

Room: Grand Gallery D

Session Chair: ***Mark Adamovits,*** *Matthews International Corp., Searcy, AR*

Comparison of 3D Scanners for Casting Defect Characterization *(26-106)*

Dr. Robert Tuttle & Dr. Lee Wells, *Western Michigan University, Kalamazoo, MI*

This research compared the performance of a high-resolution industrial 3D optical profilometer to a consumer grade 3D scanner for defect scanning. Artificial vein and burn-on defects were created using 3D printed cores. These were then used to produce aluminum castings with artificial defects on them. Those defects were scanned using both systems and the resulting 3D point clouds compared. The consumer grade unit produced scans with less surface detail. However, there was very close agreement between the two systems when examining veins and burn-ons. This suggests that consumer grade 3D scanners can assist in creating systems for automatic surface defect detection for cast surfaces.

Classification of Cast Surface Defects *(26-060)*

Dr. Robert Tuttle, Nachiket Shinde, Dr. Sam Ramrattan, & Dr. Lee Wells, *Western Michigan University, Kalamazoo, MI*

The performance, aesthetics, and functioning of cast components are all severely impacted by surface defects in castings. Some examples of surface defects are veins, penetration/burn-on, rat tails, and erosion. Within the scope of this investigation, a thorough classification strategy for veins and penetration/burn-on defects was investigated through the application of modern surface scanning and machine learning approaches. A Keyence VR-3000 G2 was used to collect 3D point cloud data. The point cloud data that was obtained was then converted into solid models for creating additional defects for the development of a classification model. Experimental castings were carried out with a variety of process parameters to create a larger variation in surface roughness. This was then followed by surface analysis to extract important characteristics. Machine learning algorithms, such as decision trees and random forests, were utilized to construct and evaluate their ability to classify the defects. These models were developed by utilizing surface roughness and volumetric data. Based on the findings, it was determined that models that utilized volumetric data attained a better level of accuracy, which offered useful insights into the classification of defects. The findings of this study illustrate the possibility for automated defect classification.

Effect of Process Variables on Surface Defects in Aluminum Castings *(26-063)*

Dr. Robert Tuttle, Nachiket Shinde, Dr. Sam Ramrattan, & Dr. Lee Wells, *Western Michigan University, Kalamazoo, MI*

Aluminum castings continue to be impacted by surface defects including veining, burn-on, and metal penetration, which are mostly caused by intricate relationships between process variables and mold material behavior. This study examines how the surface quality of aluminum alloy castings are affected by process variables, such as the mold compaction method, head height, sand type, binder percentage, and pouring temperature. 319 aluminum poured against disc-shaped sand samples, made with silica and ceramic sand. A high-resolution 3D optical profilometry was used to quantitatively characterize surface defects, allowing for the extraction of geometric attributes and the generation of new attributes for predicting whether there is a defect or not. Using a multivariate dataset of 142 samples, neural networks and deep learning models were created to predict whether there is a defect or not The circularity * max height/perimeter (cir *MH/P) attribute was generated as a scale-independent measure of the magnitude of surface defects, combining vertical intensity and form fidelity. Early models performed poorly across different heats. However, including ambient humidity and poured metal weight as additional attributes greatly enhanced modeling accuracy. The resulting deep learning model produced an R2 value of 0.755 and an RMSE of 0.0169, showing that the modeling approach is effective when applied to complex surface defect predictions in aluminum castings. This approach shows how integrating sophisticated predictive modeling with physical experimentation improves defect knowledge and provides a scalable route to intelligent casting process optimization.

Schedule is subject to change.

TALENT DEVELOPMENT DIVISION

Room: Grand Gallery E

Session Chair: ***Amanda Groves,*** *Lodge Mfg. Co., South Pittsburg, TN*

Talent Development Programs for Production Employees and Front-line Leaders at Lodge Cast Iron *(26-079)*

Mike Noble, *Lodge Cast Iron, South Pittsburg, TN*

Lodge Cast Iron has successfully implemented talent development programs in the operations group focused on building skills and capabilities of front-line leaders and production employees looking to expand their contributions to the organization. Over the past year, 45 employees have participated in development programs that have enabled them to contribute to the company's success is more substantial ways. The programs have been a combination of participative classroom sessions and on-line training and assessments. The initial participants were by invite only, but as word spread of the development courses, many others have asked to join and actively ask when the next session is. The resulting development has enabled more ownership where the value-add work is being performed.

PANEL: From Toxic to Thriving- Boosting Engagement through Positive Workplace Cultures *(26-112)*

Patrick Frazier, *ME Global, Tempe, AZ;* ***Derek Brown,*** *SafePath Solutions, Birmingham, AL;* ***Jim Peterson,*** *ADECCO, St. Perryville, MO*

You've heard it before…culture has the power to make or break a team. Culture impacts EVERYTHING…from your ability to attract and retain talent to organizational performance to employee morale. During this panel discussion, several industry HR practitioners will discuss their experiences identifying and understanding the impact of toxic workplace attributes and working across their organizations to positively impact their company culture driving employee commitment and engagement.

1:30 – 4:30 p.m.

AFS INSTITUTE

Room: Grand Gallery F

Preview: Intro to Industry 4.0 *(26-139)*

David Blondheim, Jr., *Mercury Marine, Fond du Lac, WI*

This course offers a foundational overview with the technologies of Industry 4.0. Learners will have an understanding of the definitions of I4.0 technologies, and how digital transformation is enabling smarter manufacturing.

1:45 – 2:10 p.m.

SPONSORED PRESENTATION

Room: Casting Source Theater

Where Foundry Margins are Won or Lost

Cole Clayton, *B&L Information Systems Bridgman, Michigan*

Foundry margins don't disappear overnight. They erode quietly as real production costs drift away from the quote. Most leaders don't see the damage until month-end, when it's too late to fix. This session takes a clear, shop-level look at where margin is actually won or lost in metalcasting. Attendees will see how high-performing foundries get earlier financial visibility, hold teams accountable at the job level, and protect margin while work is still running.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

2:30 – 3:15 p.m.

CASTING DESIGNERS & BUYERS

Room:
Casting Source Theater

Session Chair:
Kim Phelan, *American Foundry Society, Inc., Schaumburg, IL*

From Concept to Casting: The Stress-Free Playbook for Sourcing *(26-145)*

Kory Anderson, *Dakota Foundry, Inc., Webster, SD*

Your step-by-step guide to designing better parts, choosing the right foundry, and simplifying production from start to finish. This session will cover alloys, specifications, defect prevention, and why collaboration with your foundry is essential. Whether you're an engineer, buyer, or project manager, you'll walk away with confidence and clarity, as well as a physical playbook packed with design tips, process insights, and sourcing checklists to take back to your team.

3:15 – 4:45 p.m.

ADDITIVE MANUFACTURING DIVISION

Room:
Grand Gallery D

Session Chair:
Rich Lonardo, *Defense & Energy Systems, Poland, OH;* ***Brandon Lamoncha,*** *Humtown Products, Columbiana, OH*

Printed Sand Equipment Development and New Innovations *(26-099)*

Greg Colvin, *Honeywell Aerospace, Phoenix, AZ*

US casting supply has limited responsiveness for many high integrity systems, especially for sporadic low quantity demand military applications. 3D Printed Sand provides an opportunity to augment the casting supply chain by filling gaps in supplier readiness and producing mold sections with greater geometric complexity relative to traditional sand mold production methods. This presentation will discuss current printed sand equipment available to US foundries versus equipment that has recently become available for printing sand cores and mold sections. The presentation will discuss what is required to satisfy Honeywell sand casting requirements relative to the different printed sand equipment casting quality results. The different equipment types offer options in printed sand binder compositions, surface finish of printed sand and variation in ease of sand removal post-casting. In summary, this session will help the casting industry improve their leverage of printed sand technologies to support their casting processes and applications.

Lessons Learned on the Study of As-Cast Surface Finish of Aluminum Aerospace Castings Made using the 3D Printed Precision Sand Casting Process (Impact 1) *(26-108)*

Jiten Shah, *Product Development & Analysis LLC, Naperville, IL*

The results from OSD funded and Honeywell led research on complex aerospace aluminum alloy 3D printed sand castings. The research focused on as-cast surface finish and dimensional control of 3D printed molds and cores, with reduction in out-gassing will be presented using the best practice driven data generated with the AFS Test Casting poured at Denison Industries and other military castings poured at Ohio Aluminum, Chicago Magnesium, and Carley foundries. This is a two-year research project and results till-date will be presented along with a web enabled tool incorporated into the MMDS (Mold Material Data Search) tool developed by PDA. The knowledge and best practices generated through the research project will be incorporated into future AFS course curriculum and Institute training courses as well as a revised publication of "The 3D Printed Precision Sand Casting Process" pocket book.

ADDITIVE MANUFACTURING DIVISION

Room:
Grand Gallery D

Session Chair:
Rich Lonardo, *Defense & Energy Systems, Poland, OH;* ***Brandon Lamoncha,*** *Humtown Products, Columbiana, OH*

Advanced AM and 3D Printed Sand Mold Technologies to Support Casting Supply *(26-109)*

Greg Colvin, *Honeywell Aerospace, Phoenix, AZ*

US casting supply has limited responsiveness for many high integrity hardware especially for sporadic low quantity demand military applications. Additive Manufacturing provides an opportunity to augment the casting supply chain by filling gaps in supplier readiness. This presentation will discuss new advanced AM technologies that can be leveraged by the casting supply chain to improve their responsiveness to new casting orders especially those of low demand high integrity hardware. Technologies discussed will include improvements to 3D printed sand mold production methods for producing sand castings. These will include improving sand mold surface roughness, reducing outgassing from 3D printed sand mold during casting and methods to reduce dimensional variation between repetitive mold builds. AM technologies available to build rapid tooling including machining fixtures and inspection tooling will be discussed. Advanced AM high strength metallic and polymeric systems will be presented that can be leveraged for tooling and other applications. In summary, this session will help the casting industry practitioner review and possibly leverage Additive Manufacturing technologies to support their particular casting processes and applications.

COPPER DIVISION

Room:
Grand Gallery B

Session Chair:
Paul Clements, *Sloan Valve Co. Augusta, AR*

Change Culture and What it has to do With Defect Analysis *(26-118)*

Paul Clements, *Sloan Valve Co., Augusta, AR*

An introduction to a hybrid approach that combines key components of the DMAIC (Define, Measure, Analyze, Improve, Control) and Total Quality Management (TQM) methodologies to identify and address the root causes of scrap in copper casting operations. Attendees will explore how these complementary approaches can be integrated to systematically diagnose quality issues, implement effective countermeasures, and drive continuous improvement. Additionally, participants will learn how to apply TQM principles, such as customer focus, process optimization, and employee involvement, to create a culture of quality and achieve sustainable results. By the end of the session, attendees will be equipped with the tools and strategies needed to improve process efficiency, reduce scrap, and enhance product quality in their casting operations.

PANEL: Copper Casting Defects (26-128)

Jeff Sorenson, *MRL Material Resources LLC, Lincoln, AL;* ***Mike Buyarski,*** *The Federal Metal Co., Bedford, OH;* ***Leigh Omer,*** *H Kramer & Co., Chicago, IL*

Casting defects remain a major challenge in foundries, leading to costly scrap, rework, and production delays that impact profitability and customer satisfaction. Foundries work to mitigate these issues through process optimization, simulation, and rigorous quality control, yet diagnosing root causes often remains complex. Compounding the problem is a growing skills gap, as much of the practical "know-how" and experiential knowledge is being lost to retirement. This panel brings together experts to address casting defect questions, share insights, and discuss practical strategies for defect prevention and knowledge retention.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

3:15 – 4:45 p.m.

MELTING METHODS & MATERIALS DIVISION

Room: Grand Gallery C

Session Chair: ***Mike Mutton,*** *Larpen Metallurgical Service, Ludington, MI*

Dumb Luck *(26-125)*

Patrick Leper, *Saveway USA Corp., North Canton, OH*

Dissecting and analyzing inductor linings after melting campaigns is beneficial whether the campaign is considered a success or failure. Data from the furnace readings such as conductance and reactance can indicate extensive wear or clogging. Furthermore, temperature and wear variations, measured by various devices, can detect less obvious issues. Oftentimes, the chosen solution to unsatisfactory lining campaigns is to change materials or vendors. But a process review, and willingness to alter processes, can be more beneficial to understanding effects on inductor refractory and safely increasing inductor lining life. Time, available labor and technical assistance can make such a "post-mortem" challenging, but the infrequency of inductor relines typically reduces those demands. This presentation will compare the approaches taken in two different applications, holding and pouring, and how practices were revised to achieve improved results.

Refractory Selection as an End User *(26-126)*

Alexandria Doll, *AMERICAN Cast Iron Pipe Company, Birmingham, AL*

Selecting a refractory material as an end user can seem daunting. It's not a magic powder but it's not just dirt either. Due to this, there can become a tendency to rely on suppliers for material selection and ignore the refractory until it causes a major problem. The issue with that method is, the success of a refractory is usually dependent on the total sum of many choices and conditions of which nobody knows better than the end user themselves. This presentation will aim to give end users the basic tools to feel more confident selecting, monitoring, and evaluating refractories so that they can have safer work environments, lower costs, and better efficiency in their process overall.

MOLDING METHODS & MATERIALS DIVISION

Room: Grand Gallery A

Session Chair: ***Scott Giese,*** *University of Northern Iowa, Cedar Falls, IA*

PANEL: Coating Application, Advancements and Trends *(26-110)*

Bruce Lundeen, *Foseco, Joliet, IL;* ***Daniel Cygal,*** *HA International, Westmont, IL;* ***Matthew Hall,*** *REFCOTEC, Inc., Orrville, OH;* ***Stacey Clifford,*** *ASK Chemicals, Dublin, OH*

This panel will highlight recent trends, advancements, and the application of foundry coatings. The focus will be on the practical needs and aspects of coating testing and application in working foundries, and how these can affect coating performance and casting quality. You are invited to discuss these topics with the panel, as well as potential requirements for alternative coating testing necessary for industrial adoption.

Utilizing Automatic Density Control to Reduce the Need for Zircon-Based Coatings *(26-032)*

Bruce Lundeen, *Foseco, Joliet, IL*

For years, zircon based refractory coatings have been the gold standard used for heavy section and medium section ferrous castings. Zircon based refractory coatings are well known for their excellent mold to metal interface protection against casting defects like burn-on/burn-in and penetration defects. One of the other attributes of a zircon-based coating is its ability to be more forgiving when the coating is outside the application specifications and are still able to produce a casting with minimal mold-metal reactions. Foundries have utilized zircon-based coatings as a "crutch" to their molding/coating process. Along with the fact that zircon as a mineral is more costly compared with other refractory materials for foundry uses, an additional downside of zircon-based coatings is the volatility of the zircon sand market. The zircon sand market can be hampered by many factors including demand-supply gaps, high freight cost, tariffs and strict mining policies. More recently, some foundries have experienced concerns relating to Naturally Occurring Radioactive Material (NORM) readings in their waste or recycle streams from either zircon sand or flour used in these applications. As new sources of zircon enter the market this issue can become a greater concern. Coatings suppliers have developed zircon alternatives that have been shown to work equally as well as zircon coatings on various alloys and metal section thicknesses. These alternatives are not as forgiving as the 100% zircon-based coatings and need more control on application specifications. Traditionally, coatings applications have been controlled manually using the Baumé test (which helps measure dilution consistency), density, and/or the flow cup test (which measures viscosity). However, the accuracy of these methods relies on a range of variables, primarily on the operators of reproducing these tests with very little variability. In those incidences the application specification is slightly or dramatically out of range, the zircon alternative coatings will fail. New technology in automatic coating control units, takes those variables out of the hands of the operators. By utilizing the automatic coating control units, and being able to control zircon alternatives application properties more accurately, the potential of reducing or eliminating zircon based coatings can be dramatically increased.

Schedule is subject to change.

YOUNG PROFESSIONALS

Room: Grand Gallery E

Session Chair: ***Evan Letourneau,*** *MAGMA Foundry Technologies, Schaumburg, IL*

PANEL: Building the Talent Pipeline-Onboarding and Retaining Skilled Foundry Talent (26-111)

Nathaniel Bryant, *University of Northern Iowa, Cedar Falls, IA;* ***Brian Lewis,*** *FEF, Schaumburg, IL;* ***Ron Aultman,*** *McWane, Inc., Birmingham, AL;* ***Noah Brack,*** *Georgia Southern University, Statesboro, GA;* ***Patrick Frazier,*** *ME Global, Inc., Tempe, AZ*

The success of every foundry depends on the strength of its people, from patternmakers and electricians to engineers and future leaders. As experienced workers retire, many new recruits are entering the industry with little foundry experience. It is essential that their onboarding engages new recruits with meaningful work and targeted education, to allow them to quickly build on the work of their predecessors. This interactive panel will bring together voices from across the metalcasting workforce pipeline, including educators, HR leaders, technical experts, recent graduates, and The Foundry Education Foundation, to explore how foundries can bridge the gap between talent supply and industry demand. Panelists will share insights on:

- Talent Development & Retention: How the Foundry Educational Foundation and HR leaders ensure that new talent not only enters the industry but also thrives
- Student & Early Career Perspectives: What young professionals are looking for when they enter the workforce—and the support they need to succeed.
- Building Technical Teams: Practical strategies for developing technical expertise within foundries, from onboarding to sequencing knowledge growth across trades and engineering roles.
- Academic Perspectives: What professors are teaching today's students, how curricula align with industry needs, and where the gaps remain.

Together, we'll examine today's workforce challenges, the role of education partnerships, and how foundries can successfully onboard and retain the next generation of talent.

Thank you to our Young Professionals Sponsors:

3:30 – 4:15 p.m.

CASTING DESIGNERS & BUYERS

Room: Casting Source Theater

Session Chair: ***Kim Phelan,*** *American Foundry Society, Inc., Schaumburg, IL*

Countdown to Meltdown: Mastering 5 Major Casting Processes *(26-146)*

Laura Bartlett, *Missouri University of Science and Technology, Rolla, MO*

Time to demystify the details and distinctions of seven metal casting processes: green sand, air-set/nobake, permanent mold, investment casting, and lost foam. Buyers: You'll be prepared to converse with foundries about which process best suits your casting program. Designers: You'll increase your knowledge of (1) designing for manufacturability, (2) the correlation between process and casting tolerance, and (3) achieving the desired properties for your casting, including weight, size, and surface finish.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

4:30 p.m.

EVENT

Room:
Hall B-C

Exhibit Floor Reception

Attendees are encouraged to mingle on the exhibit floor with exhibitors. Enjoy appetizers and refreshments.

5 p.m.

EVENT

Room:
River Overlook Pre-Function

AFS Young Professionals Reception

You're Invited! AFS Young Professionals Networking Reception – Cocktails & Great Connections! Ready to mix, mingle, and make valuable connections at Metalcasting Congress 2026? Join us for the AFS Young Professionals Networking Reception in the River Overlook Pre-Function area at the DeVos Conference Center! Enjoy some beverages while networking with fellow rising leaders in metalcasting. Whether you're already on the management track or aspiring to be, this is the perfect chance to build relationships, swap ideas, and take your career to the next level—all in a relaxed, fun atmosphere. Don't miss out—grab a drink and grow your network! We can't wait to see you there!

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6 – 9 p.m.

EVENT

Room:
Grand Rapids Public Museum

Alumni Dinner
(AFS Alumni only. Ticket Required)

Alumni will experience the Grand Rapids Public Museum touring the special exhibits and permanent installations, while enjoying bold American cuisine. Must be a member of AFS Alumni to attend.

Schedule is subject to change.

Thursday, April 16, 2026

7 – 8 a.m.

Room:
Galley Overlook GH

Author/Chair Breakfast

This breakfast is for AFS speakers, session chairs, students and staff to meet and coordinate details for the day's educational sessions.

7 – 8 a.m.

Room:
Steelcase Ballroom D

Copper Breakfast

The Copper Division will present their annual awards during the breakfast. The breakfast is open to everyone with an interest in copper alloys.

8 a.m. – Noon

Room:
Grand Gallery

Registration Open

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7:30 – 10:30 a.m.

Room:
Grand Gallery

Coffee Station by AFS Technical Sessions

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9 a.m. – Noon

Room:
Grand Gallery

Exhibit Hall Open

Events · Technical Track · Management Track · AFS Institute · Casting Designers & Buyers Track

Schedule is subject to change.

8 – 9 a.m.

ADDITIVE MANUFACTURING DIVISION

Room:
Grand Gallery D

Session Chair:
Nathaniel Bryant, *University of Northern Iowa, Cedar Falls, IA;* ***Jerry Thiel,*** *Precision Casting Technologies LLC, Dysart, IA*

Efficient Categorization of Binder Jetting Printer Settings Using ANN Sensitivity Evaluation *(26-043)*

Jonathan Kabasele, *University of Johannesburg, South Africa;* ***Kasongo Nyembwe,*** *Cape Peninsula University of Technology, South Africa*

This study employs Artificial Neural Network (ANN) sensitivity analysis to rank the impact of key binder jetting parameters, namely AFS grain fineness, printhead speed, drop mass, and print resolution (DX), on the strength of 3D-printed sand moulds. Results indicate that AFS grain fineness accounts for more than 70% of the influence on mould strength, with the remaining parameters contributing 30%. Leveraging these findings, an efficient categorization was developed. By ranking parameters through cumulative scoring, this classification highlights the relative importance of each variable. The resulting classification offers foundries a strategic tool to optimise binder jetting processes, adaptable to different machines and parameters. This approach advances innovation in the foundry industry, aligns with Fourth Industrial Revolution (4IR) technologies, and supports the United Nations Sustainable Development Goal 9, promoting industry, innovation, and infrastructure development.

Quantitative Assessment of Printhead Test Patterns in Binder Jet Additive Manufacturing *(26-056)*

Jacob O'Dell, Nathaniel Bryant, & Joshua O'Dell, *University of Northern Iowa, Cedar Falls, IA*

In binder jet additive manufacturing, printhead test patterns are routinely generated to assess equipment health. Traditionally, operators evaluate these patterns qualitatively, relying on personal judgment to determine whether to proceed with printing or perform maintenance. Improper evaluations can lead to unnecessary maintenance or prints with a high risk of failure and scrap. To address this, the University of Northern Iowa has developed a preliminary software package that objectively analyzes printhead test patterns and assigns a quantitative health score. This score enables longitudinal tracking and analysis of printhead performance, providing actionable thresholds to support consistent and reliable printing operations.

CAST IRON DIVISION

Room:
Grand Gallery C

Session Chair:
Dr. Kathy Hayrynen, *Aalberts Surface Technologies, Livonia, MI;* ***Brandon Reneau,*** *Caterpillar, Inc., Dunfermline, IL*

Evaluation of the Tensile Strength of Structurally Welded Gray and Ductile Iron Castings *(26-017)*

Trevor Beach, *Betz Industries, Grand Rapids, MI*

The paper discusses the weld method and test results for welding different grades of gray and ductile iron with a variety of welding rods

8 – 9 a.m.

COPPER DIVISION

Room:
Grand Gallery B

Session Chair:
Andy Shea, A Y *McDonald Mfg. Co., Dubuque, IA*

PANEL: Capital Equipment Projects *(26-129)*

Jason Brigham, *Kodiak Group, Kendallville, IN;* ***Andy Bain,*** *The Ford Meter Box Co. Inc., Wabash, IN;* ***Andy Shea,*** *A Y McDonald Mfg. Co., Dubuque, IA;* ***Brent Bowles,*** *Mueller Water Products, Oxford, AL*

Capital equipment projects in foundries require careful planning and decision-making, as selecting the right equipment directly affects productivity, quality, and long-term ROI. Choosing qualified consultants or project managers is critical to ensure proper layout design, integration with existing systems, and smooth project execution. Maintenance strategies must be defined early to balance uptime, reliability, and total cost of ownership. Foundries face tough trade-offs during the conception, design, and execution phase that must be handled well to maximize gains and minimize cost. This panel will explore considerations needed to execute capital projects well and avoid project risks that can lead to costly overruns and missed production targets.

Schedule is subject to change.

ENGINEERING & SMART MANUFACTURING DIVISION

Room:
Grand Gallery A

Session Chair:
Jim Wenson, *Sinto America, Grand Ledge, MI*

Unlocking the Future: How Data and AI Redefine Foundry Success (26-098)

Susan Bear, *Grede Castings, Southfield, MI;* ***Derek Yesmunt,*** *Norican Group, LaGrange, GA*

The future of metalcasting belongs to foundries that harness data and act on it in real time. With actual success stories, this paper will reveal how IIoT systems enhanced with AI are transforming foundries—driving productivity, cutting scrap and building resilience. Highlighting:

- A single, trusted platform that captures and applies decades of process knowledge
- AI-driven optimization reduces scrap by up to 50% while improving casting quality
- Smart automation empowers new hires and offsets the loss of experienced workers
- Data-driven insights cut energy costs and improve sustainability.

Insights from IIoT and AI deployments in 30+ countries, including Grede (US), and Condals (Spain). It will analyze the actions behind successes like a 50% drop in defects at one Grede green sand foundry, over 50% AI-driven scrap reductions for high-compliance patterns at Condals green sand foundry, and a 52% scrap reduction at a HPDC facility.

Comprehensive Operational Improvement through Cross-functional Collaboration and Cadence of Accountability *(26-078)*

Mike Noble, *Lodge Cast Iron, South Pittsburg, TN*

The Lodge Manufacturing Team has realized comprehensive operational improvement through the use of a daily accountability meeting with a cross functional group of team members including typical operations, maintenance, and engineering staff in addition to HR and Finance representatives. As a result of their comprehensive work, they have achieved year-on-year improvement of $7,000,000 via increased throughput, reduced waste, and lower overtime costs. The impressive performance has enabled Lodge to weather the tariff-storm and deliver solid financial results, paying profits back to employees and family shareholders.

9:15 – 10:15 a.m.

TALENT DEVELOPMENT DIVISION

Room:
Grand Gallery C

Session Chair:
TBA

Hire for Fit. Train for Skill. Retain for Life: A Strategic Approach to Talent Acquisition and Retention *(26-023)*

Bill Padnos, *Non-Ferrous Founders' Society, Battle Creek, MI*

U.S. manufacturing is facing a talent shortage, with over 2.1 million jobs projected to go unfilled by 2030, including more than 380,000 in metal casting. In this environment, the traditional "post and hope" recruitment method is no longer a viable option for long-term success. Foundries must shift to a demand-driven approach to workforce development that prioritizes hiring for fit and training for skill. This paper outlines a strategic workforce solution model designed to help foundries build engaged, purpose-driven teams that will then reduce costly turnover. The model focuses on aligning recruitment practices with organizational goals, fostering employee development, and cultivating a culture of accountability and growth. By investing in both people and processes, foundries can create a resilient talent pipeline that not only fills roles, but also drives innovation, boosts productivity, and positions them for sustained success in this competitive and evolving industry landscape.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

Schedule is subject to change.

8 – 9 a.m.

AFS INSTITUTE

Room:
Grand Gallery F

Introduction to Casting Alloys *(26-140)*

Patrick Kluesner, *Grede Castings, Wauwatosa, WI*

This course will provide the learner with a comparison of the commonly cast ferrous and nonferrous alloys. There will be discussions of applications, properties, and criteria for selection of the following alloys: iron, steel, copper, aluminum, and magnesium.

9:15 – 9:40 a.m.

SPONSORED PRESENTATION

Room:
Casting Source Theater

Global Experience with Highly Technical Feeders

Tom Iven, *Chemex Foundry Solutions GmbH, an HA Group company, Düsseldorf, Germany*

Advanced feeding technologies are enabling foundries to achieve greater casting section soundness, reduced shrinkage, and longer feeding distances than traditional exothermic or insulating risers allow. This session features a case study where Tele-Feeder Systems, combined with additional technologies, were used to extend feeding distance to areas not previously accessible. Tom Iven will share global best practices with different simulation technologies to engineer a beneficial feeding system to lower the overall cost to our customer producing a casting.

9:15 – 10:15 a.m.

ADDITIVE MANUFACTURING DIVISION

Room:
Grand Gallery D

Session Chair:
Kirk Rogers, *The Barnes Global Advisors, Poland, OH;* ***Jason Bradley,*** *Mueller Co., Chattanooga, TN*

Optimizing Material Selection for Additively Manufactured Titanium Heat Exchangers *(26-041)*

Franklin Onyeka Ochonogor, *Vaal University of Technology, South Africa*

Additive manufacturing (AM) enables the production of intricate heat exchangers with superior performance. Selecting the right materials is crucial for optimal thermal efficiency, mechanical strength, corrosion resistance, and cost-effectiveness. Ti6Al4V, is promising due to their strength, high-temperature resistance, and corrosion resistance. However, their moderate thermal conductivity can pose challenges for heat transfer optimization. This research assesses titanium-based materials and Ti-Cu composites for AM heat exchangers operating under high-temperature and high-pressure conditions. A decision-making framework considers thermal, mechanical, corrosion, and manufacturing aspects to aid in material selection. Ti-Cu bimetallic designs are identified as offering enhanced heat transfer capabilities while preserving corrosion resistance and fatigue strength. Post-processing techniques like hot isostatic pressing and surface treatments can further improve material performance. This study offers a practical guide for designing and manufacturing AM heat exchangers in aerospace, chemical, and energy sectors, striking a balance between selection and production.

COPPER DIVISION

Room:
Grand Gallery B

Session Chair:
Jacob Johnson, *Foseco, Brook Park, OH*

Surface Alloying and Surface Compositing of Copper Alloy Castings using Mold and Core Coatings *(2026-026)*

Kaustubh Rane, Mehran Zare, Flavio Toma, Swaroop Behera, Benjamin Church, & Pradeep Rohatgi, *University of Wisconsin, Milwaukee, WI*

This study presents a technique for simultaneous surface alloying and surface compositing (SASC) of C89836 brass castings. Core surfaces were coated with a slurry of Cu, Ni, and Ni-coated graphite powders before casting. During solidification, Ni and Cu dissolved into the melt and enriched the surface, while graphite particles were embedded in the matrix, forming a composite layer. Microstructural characterization by optical microscopy, SEM, and XRD confirmed uniform Ni enrichment and graphite incorporation. Electrochemical and ICP-MS tests showed SASC castings had reduced corrosion rates and lower lead leaching, while machinability improved through the formation of short, granular chips instead of long, spiral chips. Compared with both the base alloy and Ni/Cu surface alloyed castings, SASC provided simultaneous improvements in corrosion resistance, lead leaching mitigation, and machinability. These findings demonstrate the potential of SASC technique for producing safer, high-performance brass components.

Induction-Assisted Feeding Systems: Unlocking Energy, Yield, and Sustainability Gains in Modern Foundries *(2026-061)*

Diego Martinez, Sanat Maiti, & Rahele Nikonam, *Foseco, Netherlands;* ***Johan Ekengard & Frank Bjerkelund,*** *Effee Foundry AS, Norway*

A significant leap in foundry efficiency can be achieved by rethinking how risers (feeders) are heated and controlled. This paper presents an induction-assisted feeding system that precisely manages riser solidification time, enabling drastic reductions in excess metal while maintaining optimal feeding performance. The result is improved energy efficiency, metal yield, sustainability, and cost competitiveness. Applied in sand-molded, gravity-poured non-ferrous foundries, the technology has delivered tangible results, including lower energy use, higher yield, shorter cycles, greater capacity, reduced emissions, and improved casting quality. By reducing riser size and optimizing thermal profiles, it also decreases fettling and machining, minimizes waste, and improves delivery times. European foundries have confirmed the robustness and scalability of the approach, with adaptation to ferrous alloys underway. Combining a high-efficiency, low-frequency induction system with a purpose-designed high-technology sleeve creates a controlled thermal environment for leaner, more sustainable, and more profitable operations.

MARKETING DIVISION

Room:
Grand Gallery E

Session Chair:
Cara Lynch, *Inductotherm Corp., Rancocas, NJ*

Small Team, Big Impact: Lean Marketing Strategies for Your Company *(26-147)*

Alexandria Trusov, *Alpha Resources LLC, Stevensville, MI*

This presentation shows how foundries and melt shops can elevate their visibility even when Marketing duties are handled by HR, Sales, Customer Service, or other small teams. It highlights practical, easy-to-execute approaches to brand building, smart budgeting, social media, AI-assisted content creation, and basic analytics. Attendees will learn how choosing a clear long-term theme allows even minimal budgets to support multi-year campaigns—such as producing one strong ad per year—while maintaining consistency. By applying lean marketing principles and tracking simple, meaningful metrics, cross-functional teams can stretch time and budget while building a stronger, more memorable market presence.

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

9:15 – 10:15 a.m.

METALCASTING RESEARCH

Room:
Grand Gallery C

Session Chair:
Adam Kopper,
Brunswick Corp., Fond du Lac, WI

Project Report: Printed Wax Pattern Molds *(26-072)*

Tom Mueller, *Mueller AMS, Brookfield, WI*

In 2024, the AFS sponsored a research project to demonstrate the viability of 3D printed wax pattern molds. Prices and lead times for wax pattern molds have increased recently as reshoring of metal casting has increased. Given that the pressures and temperatures involved in molding wax are low compared to injection molded plastic, it seemed likely that 3D printed molds could withstand pressures and temperatures required for molding. Although thermal conductivity of printed plastics was much lower than for Aluminum, the more common mold material, the difference might be narrowed through the use of conformal cooling channels possible with 3D printing. Although the tools would not be as durable as aluminum tools, if they could survive 300-500 injections, they would be viable for approximately 40% of investment casting orders and could also be used as bridge tools for higher volume orders. This paper reports on the results of the project.

Optimizing Conformal Cooling Design for 3D-Printed Wax Molding Die Through Simulation-Driven Methods *(26-073)*

Milan Raval, *Altair Engineering, Troy, MI*

Wax molding is the foundation of investment casting, producing the wax pattern that defines the accuracy, surface finish, and complexity of the final part. Conformal cooling enhances this process by improving efficiency, consistency, and overall quality. One of the challenges of using printed wax mold in this type of manufacturing is that thermal conductivity is much lower than the aluminum die which increases the overall cycle time for wax pattern creation. And consequently, increases the cost of the pattern. Conformal cooling channels design facilitates more uniform and efficient heat removal during wax injection, resulting in expedited cycle times, improved surface quality, and increased energy efficiency. This research paper delves into various methods for designing, simulating, and optimizing conventional cooling channels to transform them into more effective conformal cooling channels for 3-D printed thermoplastic die to minimize costs and overall cycle times within the wax molding process of investment casting.

STEEL DIVISION

ENGINEERING & SMART MANUFACTURING DIVISION

Room:
Grand Gallery A

Session Chair:
Koushik Balasubramanian,
Cleveland Cliffs, Inc., Miamisburg, OH

SILVER ANNIVERSARY LECTURE: Technological Landscape of the Metalcasting Industry for the Next 30 years *(26-049)*

Jiten Shah, *Product Development & Analysis LLC, Naperville, IL*

Computer Integrated Manufacturing to Steel Casting Industry was published and presented in 1992 when I was working in a large steel foundry. Since 1993, the author has been keeping up with the technological advancements through active participation in the research in the areas of Industry 4.0, AI/ML, Common Data Modeling, AM for metal casting, Advance Process Simulation, Digital Manufacturing and Digital Transformation, online tools for design engineers; are some of the topics with published technical papers. The silver anniversary technical paper will walk through the recent advancements in some of these areas and author will provide his perspective on some of the technologies playing a dominant role in metal casting industry for the next 30 years.

Schedule is subject to change.

10:30 – 11 a.m.

CASTING DESIGNERS & BUYERS

Room:
Casting Source Theater

Session Chair:
Kim Phelan,
American Foundry Society, Inc., Schaumburg, IL

Casting of the Year

The Mueller Water Works design team walks you through the incredible journey they made to achieve their 2025 Casting of Year project.

10:30 – 11 a.m.

CASTING DESIGNERS & BUYERS

Room:
Casting Source Theater

Session Chair:
Kim Phelan,
American Foundry Society, Inc., Schaumburg, IL

Update on AFS's Aluminum Casting Performance Initiative (ACPI) Research Project Focused on Developing Properties with Design Allowable (26-048)

Jiten Shah, *Product Development & Analysis LLC, Naperville, IL*

In DoD end use, alloys not in Metallic Materials Properties Development and Standardization (MMPDS) handbook are utilized much less due to knockdown factors applied, which further leads to non-optimization in design and sourcing. This DLA/AMC funded project focuses on developing properties with design allowables for C355-T6 Sand Cast Aluminum and incorporating into MMPDS and the Casting Alloy Database Search (CADS) too with pedigree information, including chemistry, section thickness and other process & design characteristics for DoD end users to utilize castings in the C355-T6 alloy with no knockdown factor. Project progress till-date will be presented, and the project involves AFS member aluminum foundries participation to produce test castings and share separately cast test bar properties historical data to derive best practice driven design allowable.

Noon

Metalcasting Congress 2026 Concludes

Events | Technical Track | Management Track | AFS Institute | Casting Designers & Buyers Track

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