

Additive Manufacturing for Metalcasting Conference
Oct. 3-6, 2016 | Novi, Michigan

Registration Fees
AFS Member \$795 | Non AFS Member \$945

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Please select one of the following tours:

- ☐ **Tour 1 Voxeljet and TEI**
☐ **Tour 2 ExOne and Temperform**
☐ **Tour 3 Investment Cast-Aristo Cast Inc.**

Hotel Information: Sheraton Detroit Novi, 21111 Haggerty Road, Novi, MI 48375. For reservations, call 1-866-837-4180 and mention American Foundry Society to receive the special conference rate. This rate is only guaranteed until Friday, September 12, 2016. Hotel website: www.sheratondetroitnovi.com. The direct link to reserve a room for AFS Attendees is: <https://www.starwoodmeeting.com/Book/afs2016>

Airport: The Sheraton Detroit Novi is approximately 25 miles from the Detroit Metropolitan Airport (DTW). No shuttle service is available. Information on luxury sedans and taxi services is available at www.afsinc.org/additive.

Parking: For those individuals choosing to travel by car, the Sheraton Detroit Novi offers complimentary self-parking.

Cancellations and Substitutions: Substitutions will be accepted at any time. However, cancellations of confirmed registrants with full refund of fees cannot be accepted unless received two weeks prior to the conference date. In the unlikely event the conference is canceled for any reason, AFS liability is limited to the return of the registration fee.

Tax Deduction of Expenses: An income tax deduction is allowed for expenses of education, including registration fee, travel, meals and lodging, undertaken to maintain and improve professional skills.

Return Form To:
American Foundry Society, 35169 Eagle Way, Chicago, IL 60678-1351
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Be Part of an Industry First
**Additive
Manufacturing
For Metalcasting**
CONFERENCE



Oct 3-6, 2016
Sheraton Detroit Novi
Novi, MI
www.afsinc.org/additive

Additive Manufacturing for Metalcasting Conference

Oct. 3-6, 2016 | Novi, Michigan

We hear a lot in the news about 3-D printing technologies in manufacturing. How does this apply to the metalcasting industry?

The American Foundry Society's first full technical conference on additive manufacturing (AM) and 3-D printing will focus on how these new emerging technologies are being utilized in the foundry to produce cast components, and will cover all aspects of AM and 3-D printing for the metalcasting industry. The full program is complemented with an afternoon of plant tours of AM facilities.

Conference Agenda

Monday, October 3

10 a.m.–1 p.m. Registration

Five plant tours are scheduled for Monday, Oct. 3. Attendees can pick one of three options at the time of registration. Limited space is available. Busses will return to the hotel by 5:00 p.m. All tour attendees must use AFS transportation. Due to space limitations, personal vehicles will not be permitted.

Tour 1 Voxeljet and Tooling & Equipment International

(Bus departs at 1:15 p.m.)

Tour 2 ExOne and Temperform

(Bus departs at 1:30 p.m.)

Tour 3 Investment Cast: Aristo Cast

(Bus departs at 11 a.m. Lunch included.)

About the plants:

- **Voxeljet, Canton, Michigan:** This company is a manufacturer of industrial 3D printing systems for the production of molds and models for metal casting without tools. The American operation includes the VX 4000, the largest 3D printer currently available.
- **Tooling & Equipment International (TEI), Livonia, Michigan:** TEI is an aluminum sand casting facility and one of the most advanced users of printed sand molds and cores. TEI builds prototype and low volume production castings for a wide variety of industries.
- **ExOne, Troy, Michigan:** This company provides 3D printing machines, 3D printed products and related services to industrial customers. ExOne also supplies complex finished cast parts for prototyping and short run production. The tour will be of the primary sand operation in Troy.
- **Temperform, Novi, Michigan:** This carbon and stainless steel casting facility produces heat, corrosion and abrasion resistant castings in nobake, shell and ceramic sand processes.
- **Aristo Cast, Almont, Michigan:** A leading user of printed patterns for investment casting, Aristo Cast pours a wide selection of ferrous and non-ferrous alloys and has the ability to provide same-day precision castings in all alloys, in both prototype and production quantities.

Tuesday, October 4

7–8:00 a.m. Registration

8:00 a.m. Conference Opens/Welcome

8:15 a.m. Keynote Address

Ralph Resnick, NCDMM (National Center for Defense Manufacturing and Machining) and America Makes–National Additive Manufacturing Innovation Institute.

Session 1: Component Design for Additive Manufacturing

9:00 a.m. **The Power of Design**, Tom Prucha, *Metalmorphosis/International Journal of Metalcasting*

9:15 a.m. **Case Study on Successful Design and Production of Complex 3D Printed Cored Aluminum Sand Castings**, Dave Weiss, *Eck Industries*

9:45 a.m. **Future of 3D Printing Initiative at Caterpillar**, Rick Huff, *Caterpillar*

10:15 a.m. **Direct Metal Printing**, Kirk Rogers, *GE CATA*

10:45 a.m. Break

11:00 a.m. **Design Freedom with 3D Printing**, Jiten Shah, *PDA*

11:30 a.m. **Removing Manufacturing Constraints Using AM**, Ravi Kunju, *Solid Thinking*

12:00 p.m. **Cost Modeling to Compare Conventional Tooling vs. 3D Printed Toolingless Complex Cored Sand Castings**, Brett Connor, *Youngstown State University*

12:30 p.m. Lunch

Session 2: Mold Design and Modeling

1:30 p.m. **Optimizing Mold Designs for AM4MC**, Dave Rittmeyer, *Hoosier Pattern*

2:00 p.m. **Mold Designs for the Future**, Brandon Lamoncha, *Humtown Products*

2:30 p.m. **Solidification Analysis Technology and Process**, Mihaela Nastac, *ExOne*

3:00 p.m. Break

3:30 p.m. **Castings without Tooling**, Ted Kahaian, *Tooling and Equipment International*

4:00 p.m. **Gating System Optimization**, Roy Stevenson, *MAGMA Foundry Technologies*

4:30 p.m. **Mold Design Considerations**, Kip Woods, *University of Northern Iowa*

5:30–7:00 p.m. Networking Reception and Table Top Exhibits

Visit exhibits during the reception for the latest in additive manufacturing technologies for metalcasting. Poster sessions from universities also will be on display to show what is being done to train the next generation of metalcasters in additive manufacturing principles and techniques.

Wednesday, October 5

Session 3: Equipment

8:00 a.m. **3D Sand Printing Equipment and Capabilities**, Terry Senish, *ExOne*

8:30 a.m. **Optimizing Flexibility in 3D Sand Printing**, Wil Shambley, *Viridis3D*

9:00 a.m. **Common Considerations With Sand Printing**
Travis Frush, *University of Northern Iowa*

9:30 a.m. **Industrial X-ray and CT Analysis for Additive Manufacturing**, Ray Kramer, *Yxlon*

10:00 a.m. Break

10:15 a.m. **Printers and Binders for 3D Printing of Sand Cores and Molds**
Aaron Howard, *VoxelJet*

10:45 a.m. **Next Generation Sand and Mold Printing**, Wil Tinker, *Tinker Omega Mfg.*

11:15 a.m. **Core Box Production with a 3D Printer**, Don Covert, *Humtown Products*

11:45 a.m. Lunch and Keynote Address

John Danko, *Danko Arlington*, will give a look at the role of entrepreneurial management and training as a transformational force. Danko also will talk about the additive manufacturing technologies that have been implemented at the Danko facilities.

Session 4: Investment Casting

1:00 p.m. **Incorporating Printed Patterns Into a Production Investment Casting Environment**
Cliff Fischer, *Wisconsin Precision Casting*

1:30 p.m. **Technologies for Automated Smoothing of Printed Patterns**
Daniel Hutchinson, *Post Process Technologies*

2:00 p.m. **Printed Ceramic Cores**, Mike Hascher, *Eagle Engineered Solutions*

2:30 p.m. Break

2:45 p.m. **A Detailed Comparison of the Leading AM Methods for Creating Investment Casting Patterns**, Tom Mueller, *AMS*

3:15–3:45 p.m. **Creating Aerospace Castings with Printed Patterns**, Larry Andre, *Solidiform*

3:45 p.m. **Q & A**, Day 2 wrap-up

Thursday, October 6

8:00 a.m. Keynote Address

Using Technology to Improve Product, From Helicopters to Castings
Bill Harris, *Sikorsky Aircraft*

Session 5: Materials

8:30 a.m. **3D Silica Sand Options**, Carey Chapman, *Unimin Corporation*

9:00 a.m. **Specialty Sands for the 3D Printing Process**, John Serra, *J Serra Consulting*

9:30 a.m. **Consumable Materials for 3D Sand Printing–An Overview**
Doug Trinowski, Mitch Patterson, Sudhir Trikha, *HA International*

10:00 a.m. Break

10:15 a.m. **Binders for Printing Sand Molds and Cores**, Joe Muniza, *ASK Chemicals*

10:45 a.m. **Evaluating Materials for 3D Printing**, Rick Huff, *Caterpillar*

11:15 a.m. **The Use of Engineered Sand Additives in 3D Sand Printing**
Jeff Cieplewski, *Prince Minerals*

11:45 a.m. Lunch

Session 6: Foundry Application Case Studies

12:30 p.m. **Air Brake Core Combination**, Brandon Lamoncha, *Humtown Products*

12:45 p.m. **Deciding the Economic Factors for 3D Printing Prototype Casting**
Ron Baus, *C A Lawton*

1:00 p.m. **Using Printed Patterns to Cast Large Sculptures**, Rob Arps, *Form 3D Foundry*

1:15 p.m. **University Case Study**, Travis Frush, *University of Northern Iowa*

1:30 p.m. **Complex Casting Case Study**, Steve Murray, *Hoosier Pattern*

1:45 p.m. **Quick Turnaround on a Large Gray Iron Casting Using Printed Cores**
Tim Maurina, *C A Lawton*

2:00 p.m. **Economic Advantage for an OEM to Print Molds and Cores**
Mike Shaffer, *GE CATA*

2:15 p.m. **Using AM for Complex Castings**, Oliver Johnson, *Tooling & Equipment Intl.*

2:30 p.m. **Q & A**, Conference wrap-up

3:00 p.m. Conference Concludes

