EXPERIENCE THE ENTIRE ADDITIVE MANUFACTURING INDUSTRY AT ONE EVENT

2018 AMUG CONFERENCE PROGRAM AND AGENDA

AMUG CONFERENCE
ST. LOUIS, MISSOURI
APRIL 8 - 12, 2018

ADDITIVE MANUFACTURING USERS GROUP
FOR USERS, BY USERS
WELCOME

Welcome to the 30th Annual Additive Manufacturing Users Group (AMUG) Conference.

I am thrilled to be your AMUG president and proud to help provide this outstanding event to the AM community. AMUG Conference is a unique event, unlike the traditional expos and conferences. It is deliberately focused on benefiting AM users with presentations and workshops to help educate and support each other. It is organized and run "by users for users". The board and all its committees are volunteers, and all work very hard to provide this yearly event. Participate and you will have exposure to the use, support and best practices of industrial AM equipment.

This year marks our 30th anniversary, and it amazes me that we have grown and evolved so well in those three decades. It all started with just over a dozen users, individuals just trying to figure out how to use and leverage those early machines. Now we have grown to nearly 2000 attendees, and we have such a treasure trove of great experience.

If you are returning for your 30th AMUG Conference, or this is your first, welcome! I cannot wait to meet you. In order to best facilitate getting to know one another, please be ready to mingle. AMUG is built around the idea of networking and sharing. I encourage you to be as open as you can about what you do and how you have found ways to make your use of AM better. The more you share during the conference, the more you will get out of it.

Please bring your passion. I don’t think AMUG would have survived if we didn’t all have a true love for what we do. Yes, I have had machines break down just before Christmas, and I have had many builds crash and frustrate me, but I remain passionate, and I know you are too. Let’s share that passion and have a great event together.

I want to explain another cool aspect of AMUG. Mixed in with all the attendees, there are some members with the distinction of a DINO award. I encourage you to find one and have a conversation. They are not just members who have been doing this a long time, they also have given back to our membership and community in important ways. DINO is a very special recognition—there are typically only 5-10 awards given out each year—yet the recipients of this award are as open and giving as any other AMUG member.

So again, speaking for the entire board, welcome to the 2018 AMUG Conference, our 30th year of getting together. Meet people, give away all your business cards and fill your pockets with everyone else’s. Dive into conversations over lunch so deeply that you forget to finish your soup. Attend every event, workshop and dinner. Most of all learn, laugh and participate at every opportunity.

Paul Bates
2017-2018 AMUG President
EXPERIENCE

To call the AMUG event a conference is an understatement. It is a unique gathering of AM users, of all levels, that assemble and band together to provide and share valuable insights and experiences to help one another.

AMUG MISSION

Additive Manufacturing Users Group (AMUG) educates and advances the uses and applications of additive manufacturing technologies. The cornerstone of AMUG is the annual Education & Training Conference. AMUG members meet annually to share information, tips and tricks on additive manufacturing processes, applications, materials, ancillary equipment, and industry trends.

PHILOSOPHY

“For users, by users” is both AMUG’s philosophy and its guiding principle. Every presentation, workshop, sponsor and exhibitor passes through one simple filter: does it provide value to AM users? That is the crux of “For Users.” We then turn to users to provide the content and count on them to make the conference valuable, memorable and unique. That is the “By Users” component.

AMUG creates the sharing environment; users create the experience.
AMUG MOBILE APP

2018 AMUG CONFERENCE APP
Download the “AMUG” app from the Apple App Store or Google Play Store. Once the app opens select “2018 AMUG Conference”.

Log in with your registration email address (user name) and your registration ID (password) that was emailed to you.

Full-conference attendees receive access to all contents within the app including all course materials, presentations and evaluations.

Exhibitors and Expo Staff receive access to non-course materials.

EVALUATIONS
Speaker and Conference evaluations are accessible through the mobile app or through the online planner.

Join us Wednesday, April 11 at the Introduction to the AM Wish List session to find out more about the new AM Wish List and how to submit your feedback through the mobile app.

First-Time Attendees

Welcome First-Time Attendees!
The AMUG Conference was developed as a way for you, the user of professional additive manufacturing technology, to share ideas, information and knowledge with your fellow colleagues. We have all been in your position as a first-time attendee. Don’t be shy. Don’t be afraid to dive right in and get involved as part of the team. The more involved you get during the conference, the more value you will take away.

Along with access to the AMUG Board, AMUG Global Ambassadors, and AMUG Liaisons, you will see individuals with a dinosaur on their name tag. These individuals are known as DINOs (Distinguished INnovative Operators). Take time to introduce yourself to these individuals. DINOs have been recognized as leaders in the Additive Manufacturing industry. Pick their brains, take advantage of their knowledge.

We look forward to meeting you, and please feel free to seek us out with any questions and concerns.

Have a great conference!
We have members all over the world

The Additive Manufacturing Users Group’s origins date back to the late 1980’s when the founding industry users group was called 3D Systems North American Stereolithography Users Group, a users group solely focused on the advancement of stereolithography (SL) use with the owners and operators of 3D Systems’ equipment. Today, AMUG educates and supports users of all additive manufacturing technologies. The primary charter of the group remains the same, but its members are much more diversified, global and focused in advancing additive manufacturing technology for rapid manufacturing and prototyping.

With AMUG’s expanded range, operators/owners of any commercial technology — stereolithography (SL), selective laser sintering (SLS), 3D printing, CLIP, DMD, DMLM, DMLS, EBM, FDM, LC, LS, MJP, PolyJet, SLM, and more — can benefit from the information exchange and professional network that AMUG offers.

OBJECTIVES

- Encourage effective communication of information exchange amongst all additive manufacturing equipment owners and operators.
- Provide a forum for presentations and the ability to network with colleagues.
- Propose solutions to problems that involve basic modification to hardware or software.
- Provide an open atmosphere for technology exchange.

ACTIVITIES

- Hold annual and periodic meetings for the purpose of conducting business of the AMUG.
- Establish special task or interest groups to study specific mutual areas of interest.
- Identify problems and propose solutions or improvements and recommend uniform practices and techniques to be used by the membership.
Europe
- 2012: 262 attendees, 17 countries
- 2013: 361 attendees, 16 countries
- 2014: 527 attendees, 17 countries
- 2015: 888 attendees, 26 countries
- 2016: 1061 attendees, 23 countries
- 2017: 1548 attendees, 27 countries

Asia
- 2012: 36 attendees, 16 countries
- 2013: 82 attendees, 16 countries
- 2014: 116 attendees, 12 countries
- 2015: 327 attendees, 24 countries
- 2016: 369 attendees, 24 countries
- 2017: 524 attendees, 24 countries

Oceania
- 2012: 6 attendees, 5 countries
- 2013: 8 attendees, 5 countries
- 2014: 13 attendees, 5 countries
- 2015: 26 attendees, 5 countries
- 2016: 31 attendees, 5 countries
- 2017: 45 attendees, 5 countries
AMUG has grown, expanded and evolved to keep pace with the sweeping changes in the additive manufacturing industry. The users group has been hard at work since 1988 as a volunteer organization working with OEMs to design a community focused on advancing the uses of additive manufacturing technology.
A Users Group within a Users Group

Additive Manufacturing Users Group

At the 2011 conference, members voted to open the users group to owners/operators of all commercial additive manufacturing technologies. Objet and Stratasys joined as premier supporters of AMUG.

AMUG Celebrates 30 years of Community

Throughout the years, AMUG has grown from a small gathering of 12 individuals with a common cause to a global community with a common cause. A community that is pushing forward a passion for technology that inspires, redefines and empowers people every day, and that is changing manufacturing as we know it.

AMUG
- Users Group Conference
- Technical and educational sessions
- Hands-on workshops and training sessions
- Software training
- Panel discussions
- AMUGexpo
- Networking lunches
- Evening network events

Diamond Sponsors
- Dedicated Diamond suite for presentations and training by OEMS

Platinum Sponsors
- Shared Platinum space for presentations and training by OEMS
GENERAL INFORMATION

REGISTRATION AND BADGE PICK-UP HOURS
- Sunday, April 8: 12:00pm-6:00pm
- Monday, April 9: 7:00am - 8:00am, 10:15am-12:00pm
- Tuesday, April 10: 7:00am - 8:00am, 10:00am-10:30am

AMUGEXPO HOURS
- AMUGexpo and Dinner: Sunday, April 8: 5:00pm-10:00pm
- AMUGexpo: Monday, April 9: 10:15am - 12:00pm
- AMUGexpo, Technical Competition, and Dinner: Monday, April 9: 6:00pm - 10:00pm

AWARDS BANQUET
Conference attendees have full access to all conference activities including the AMUG Tuesday-night Awards Banquet. Conference attendees have the option of bringing a guest to the Awards Banquet for an additional fee, which can be purchased at the registration desk.
- Awards Dinner: Tuesday, April 10
- Board Buses: 5:00pm
- Buses Leave: 5:15pm promptly

You must wear your conference badge to board the bus. We suggest you wear closed-toe shoes and comfortable clothing appropriate for indoor and outdoor activities.

BUS AND SHUTTLE LOCATION
AMUG provides transportation daily between the Union Station and Hilton Ballpark hotels and to and from the Tuesday-night Awards Banquet.
TRANSPORTATION LOCATION
- UNION STATION: S 80th Street, outside Midway West door
- HILTON BALLPARK: Walnut Street entrance

DINING
Your AMUG Conference attendee pass includes all meals from Sunday evening through Thursday evening.

NAME BADGES
Wear your AMUG badge at all times during the conference, as it is required for entry to all sessions and evening activities. Badges are mandatory for the Tuesday night event. Badges are issued to the registered individual and may not be used by others.

BUSINESS MEETING
The AMUG Business Meeting will take place Wednesday, April 11 at 11:00am. The Business Meeting is for AMUG Conference attendees only. We need 17% of the AMUG attendees present for voting purposes. All AMUG Conference attendees are considered AMUG Members, even first-time attendees. Please make sure to attend!

WI-FI
Wi-Fi is available for free throughout the public areas and in your hotel room at Union Station and Hilton Ballpark hotels.

SAFETY AND SECURITY
Please do not leave your belongings or conference materials unattended in session rooms. Should you have any issues during your stay, please contact Tom Sorovetz, mobile: +1 (734) 320-6310, or visit the AMUG Information Desk located in the Grand Hall Staircase on the Midway Level.

RECYCLING BADGES
AMUG recycles the name badge holders. Prior to leaving the conference, please place your name badge holder in the box provided at the AMUG Information desk.
# AMUG Conference Agenda at-a-Glance

## Saturday, April 7
- **Pre-Conference Activity**: Golf
  - 10:00am Shotgun Start
  - AMUG Conference attendees, sponsors, exhibitors and spouses/partners welcome to participate. SPACE IS LIMITED.
  - (Additional fees apply)

## Sunday, April 8
- **Registration Open**: 7:00am-8:00am
- **Breakfast**: 7:00am-8:00am
- **AMUG Opening Address**: 8:00am-8:15am
- **Keynote**: Todd Grimm
  - T.A. Grimm
  - 8:15am-9:15am
- **AM Insights and Highlights**: 9:15am-10:15am
- **Break**: 10:15am-10:45am
- **Registration Open**: 10:15am-12:00pm
- **AMUG Expo and Sponsor Demos**
  - **EXPO OPEN**: 5:00pm - 10:00pm
  - All demo spaces and exhibits open
  - Join us Sunday night for the AMUG Expo Opening. Enjoy a Buffet Dinner and Beverages as you tour 14 Diamond Suites, 21 Platinum Demo Spaces, and 72 Exhibitors.
  - See Floor Plan on page 16-17

## Monday, April 9
- **Break**: 10:15am-10:45am
- **Registration Open**: 10:15am-12:00pm
- **Networking Lunch**: 12:00pm-1:15pm
- **AMUG and Sponsor Sessions**: 1:30pm-5:00pm
- **Family Dinner & Closing**: An event for all full conference pass attendees and sponsors.
  - AMUG Family Dinner is the official closing event at the AMUG Conference. Attendees and sponsors are encouraged to submit their family or favorite recipes for consideration.
  - Along with a family dinner there will be music and activities for everyone to participate.

## Tuesday, April 10
- **Break**: 10:00am-10:30am
- **AMUG General Session**: 10:30am-11:00am
- **AMUG Business Meeting**: 11:00am-12:00pm
- **Networking Lunch**: 12:00pm-1:15pm
- **AMUG and Sponsor Sessions**: 1:30pm-5:00pm
- **Dinner - A Taste of St. Louis**: 6:00pm-10:00pm
  - An event for all full conference pass attendees and sponsors.
  - Experience the local flavors as we take your taste buds on a culinary tour of St. Louis. Enjoy a night of great food, games, and more.
  - Transportation provided - Additional banquet tickets are available for purchase.

## Wednesday, April 11
- **Break**: 7:30am-8:30am
- **AMUG General Session**: 8:30am-9:00am
- **Innovators Showcase**
  - Fried Vancraen
  - Founder and CEO, Materialise
  - 9:00am-10:00am
- **Diamond Keynote Sessions**
  - 10:30am-12:00pm
- **Platinum Keynote Sessions**
  - 1:30pm-2:30pm
- **Diamond Sessions**
  - 2:45pm-4:00pm
- **Platinum Sessions**
  - 2:45pm-4:00pm

## Thursday, April 12
- **Break**: 10:00am-10:30am
- **AMUG Feedback Session**: 10:30am-12:00pm
- **Networking Lunch**: 12:00pm-1:15pm
- **AMUG and Sponsor Sessions**: 1:30pm-5:00pm
- **Family Dinner & Closing**
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For Users By Users

AMUG Agenda subject to change - Access the AMUG Mobile App for up to date information.
Featured Speakers

TODD GRIMM

T.A. GRIMM

Todd Grimm is a 27 year veteran of the additive manufacturing/3D printing industry. From his work as a consultant, writer, author, speaker, editor and advisor, he was named as one of The TCT Magazine’s 20 most influential in the additive manufacturing (AM) industry.

Todd is President of T. A. Grimm, an additive manufacturing consulting and communications company. He sits on the board of directors of ARC Group Worldwide (NASDAQ: ARCW). He is also a columnist for The TCT Magazine and author of User’s Guide to Rapid Prototyping. Todd currently serves on the board of the Additive Manufacturing Users Group (AMUG) as its AM industry advisor, sits on the TCT Expert Advisory Board, and is an advisor for the RAPID Conference. He has also served as chairman of the Society of Manufacturing Engineers’ (SME) RTAM community.

DR.-ING. DOMINIK RIETZEL

Head of BMW Group Additive Manufacturing Non-Metal

Dominik Rietzel studied chemical engineering at the Technische Universität in Munich (TUM) with a focus on materials and their mechanical behavior. For his diploma thesis, he was awarded the DIN prize for standardization in 2007. Subsequently he continued his academic career in Erlangen-Nuremberg as scientific assistant at the Institute of Polymer Technology (LKT), where he obtained his doctoral degree (Dr.-Ing.) with his thesis about the material behavior and process analysis for laser sintering of thermoplastic materials. Due to his work he was deputy chairman of the workgroup Polymers of the German VDI-Committee “Rapid Prototyping”. His career in the automotive field started at MAN Truck & Bus GmbH where his final position was head of quality assurance in the cabin paint shop. In 2012, he switched to the Additive Manufacturing Center of BMW Group, where he focused on additive manufacturing for serial production. His current position at BMW Group is Head of Additive Manufacturing - Non Metals.
FRIED VANCRAEN

Founder and CEO, Materialise

Materialise CEO Fried Vancraen began his career in 1985 after receiving a Master of Science in Electro-Mechanical Engineering. Working as a Research Engineer and Consultant at the Research Institute of the Belgian Metalworking Industry, Fried discovered 3D printing. Passionate about this new technology, and firm in his belief that it could help create a better and healthier world, he founded Materialise in July 1990, where he remains CEO to this day.

Materialise was established as the first rapid prototyping service bureau in the Benelux countries. Immediately after its foundation, the company concentrated on researching and developing solutions for transferring data to rapid prototyping machines, for industrial as well as medical applications. Today, Materialise’s open and flexible platforms enable players in industries such as healthcare, automotive, aerospace, art and design, and consumer goods, to build innovative 3D printing applications that make the world a better and healthier place.

Fried holds several patents related to the technical and medical applications of 3D printing and remains committed to using the technology to make positive changes in people’s lives. In recent years, Fried has been awarded the RTAM/SME Industry Achievement Award, the highest honor in the 3D printing industry, has been selected as the most influential person in additive manufacturing by industry professionals and TCT Magazine, and has been listed one of the five leading players in his sector by the Financial Times. He is also the recipient of a 2013 Visionaries! Award from the Museum of Art and Design in New York and most recently an inaugural inductee into the TCT Hall of Fame.
2018 SCHOLARSHIP WINNERS

2018 GUY E. BOURDEAU SCHOLARSHIP
DANIEL DELGADO CAMACHO University of Texas at Austin

Daniel Delgado Camacho’s research for his master’s degree is on the application of AM in the construction industry. Patricia Clayton, Ph.D., assistant professor in UT Austin’s Department of Civil, Architectural and Environmental Engineering, is Mr. Delgado Camacho’s co-advisor for his research. Dr. Clayton said, “I believe that Daniel’s research investigating large-scale construction applications for AM will provide innovative architectural and structural design and construction solutions that are only made possible by AM. I know that Daniel will be a true leader in our field, providing a much-needed excitement for technological innovation in a field (infrastructure construction) that often lags behind the innovation curve.”

In 2016, Mr. Delgado Camacho began his research on the current state of AM in the construction industry, becoming the first to do so at UT Austin. This led to his research of AM for fabrication of connections using the material extrusion process. He also foresees leveraging his knowledge and research to accelerate the advancement of concrete 3D printing for construction projects. Following his May 2018 graduation, Mr. Delgado Camacho will join ExxonMobil, a company that has enjoyed his contributions as an intern over a three-year period and sponsored him for the prestigious GEM Fellowship.

Dr. Clayton said, “I strongly believe that Daniel has the intelligence, drive, and ingenuity to develop and market pioneering applications for AM in construction. Attending the AMUG Conference will provide him opportunities to connect with and learn from the best in the field.”

Recognizing the information gap between industry, users and researchers, Mr. Delgado Camacho said, “This is knowledge I could gain by attending the AMUG Conference. The conference can provide a better picture of how far advancements in AM have come and all the benefits and potential applications that AM can offer.”

2018 RANDY STEVENS SCHOLARSHIP
DR. EMRAH CELIK, PHD University of Miami, Florida
Assistant Professor of Mechanical Engineering & Aerospace

Dr. Emrah Celik is an assistant professor, researcher and academician with a passion for AM, both as a user and as a developer of technology. He integrates AM into his engineering courses to teach students this new manufacturing platform and give them hands-on experience. Victoria Cornerstone, Ph.D., UM’s chair of the Department of Mechanical and Aerospace Engineering, said, “Dr. Celik is the leading professor in promoting application of 3D printing/additive manufacturing in teaching. Teaching 3D printing technologies and hands-on work of our college students stimulated their interest and understanding in this course.”

In his research laboratory, Advanced Nano Systems Laboratory (ANSyL), Dr. Celik investigates novel 3D printing methodologies for fabrication of energy-harvesting materials and reinforced composites for strong, yet lightweight, structural components. He works closely with federal agencies including NASA, US Airforce, and Army Research Laboratory. Dr. Celik’s aim is to develop state-of-the-art AM technologies that leverage this research.

Dr. Celik stated, “Although I have extensive experience with the 3D printing techniques, my interaction with the additive manufacturing community has been very limited. I envision that attending the AMUG Conference will give me the opportunity to initiate long-lasting interactions with the additive manufacturing community.” Dr. Cornerstone added, “This scholarship will greatly benefit Dr. Celik’s academic career, our department’s vision on continuous improvement of teaching, and lead to new research projects in his laboratory.”
The AMUG Technical Competition provides a forum for users of additive manufacturing to display their unique applications and their finishing capabilities. The competition is divided into two categories: Advanced Concepts and Advanced Finishing.

### ADVANCED CONCEPTS WINNER

**Tamper Proof Gages**

**Vince Anewenter**, Milwaukee School of Engineering (MSOE)

Vince Anewenter’s winning entry in the Advanced Concepts category was titled “Tamper Proof Gages.” Judges cited the practicality of the application and the ingenuity in resolving a common problem as reasons for the award. The gage was made for Capitol Stampings Corp. to allow shop-floor personnel to quickly perform several quality control measurements on two versions of a stamped part. The ingenious aspect is that Anewenter’s team elected to use a ceramic-filled SLA resin that would fracture if struck or dropped. Fracturing prevents a common problem of unreported gage damage, which can lead to unnecessary scrap and rework.

In the Advanced Concepts category, the challenge was really to find entries that genuinely pushed the envelope in terms of a unique or advanced use for additive manufacturing. This year’s winner in that category proved that thinking outside the box sometimes yields a solution that can be beautiful in its simplicity.

### ADVANCED FINISHING WINNER

**Matilda, 1931 Cord Series L-29 Cabriolet**

**Mike Littrell**, CIDEAS, Inc.

Mike Littrell’s winning entry in the Advanced Finishing category was an exquisite replica of a 1931 Cord Series L-29 Cabriolet. Specifically, it is a replica of #2929409 that was named “Matilda” by Mike’s father, Gary, when he owned this amazing vehicle. In collaboration with Brian Yingling, who created the CAD models and performed detail finishing, CIDEAS brought this car to life using Fused Deposition Modeling (FDM) and Stereolithography (SLA). According to Littrell, 99.9% of the car is 3D printed; the only exceptions are fabric and leather coverings, brass spokes, and brass nuts.

In the Advanced Finishing category, some of the detailed work, painting skills, and finishing skills were faultless. Ranking the entries really came down to who had truly pushed the boundaries of finishing techniques.
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<td>Lewellyn Technology</td>
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### GOLD MEDIA PARTNER CENTER

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Meeting and Event Facilities

- A total of 130,000 square feet of flexible meeting and exhibit space
- The Midway features 51,000 square feet of exhibit space
- 16,200 square foot Grand Ballroom
- 8,000 square foot Regency Ballroom

Historic venues: The Grand Hall, Gothic Corridor and The Midway
Meeting and Event Facilities

- A total of 130,000 square feet of flexible meeting and exhibit space
- The Midway features 51,000 square feet of exhibit space
- 16,200 square foot Grand Ballroom
- 8,000 square foot Regency Ballroom
- Historic venues: The Grand Hall, Gothic Corridor and The Midway

AMUG TRACK LEADERS

AEROSPACE
Ted Anderson
GE Additive

AM TECHNOLOGIES
Non-Metal
Andrew Allshorn
At 3D-Squared Ltd

AM METALS
Bob Markley
3rd Dimension LLC

CASTING
Steve Murray
Consultant

CASTING
Thomas Sorovetz
FCA US LLC

CASTING
Jack Ziomba
Arista Cast

EDUCATION & TRAINING
Jordan Weston
Milwaukee School of Engineering (MSOE)

MATERIALS
Nate Schumacher
Midwest Prototype

MEDICAL & DENTAL
Shannon VanDeren
Layered Manufacturing and Consulting

SCANNING & METROLOGY
Giles Gaskell
Wenzel America Ltd.
| 7:00am - 8:00am | REGISTRATION and BADGE PICK-UP | Grand Ballroom F, 1st Floor |
| 8:00am - 8:15am | AMUG OPENING ADDRESS | Grand Ballroom A-C, 1st Floor |
| 8:15am - 9:15am | AMUG INSIGHTS and HIGHLIGHTS | Grand Ballroom A-C, 1st Floor |
| 9:15am - 10:45am | BREAK | Grand Ballroom A-C, 1st Floor |
| 10:45am - 11:30am | REGISTRATION and BADGE PICK-UP | Grand Ballroom A-C, 1st Floor |
| 11:30am - 12:15pm | AMUGEXPO and SPONSOR DEMO OPEN | Grand Ballroom A-C, 1st Floor |

### Monday, April 5

#### 7:00am - 8:00am
- **Breakfast**
- Grand Ballroom F, 1st Floor

#### 8:00am - 8:15am
- **AMUG OPENING ADDRESS**
- Paul Bates, AMUG President
- Grand Ballroom A-C, 1st Floor

#### 8:15am - 9:15am
- **AMUG INSIGHTS and HIGHLIGHTS**
  - Mark Barfoot, AMUG Past President and James Woodcock, The TCT Group
  - Grand Ballroom A-C, 1st Floor

#### 9:15am - 10:30am
- **Break**
- Grand Ballroom A-C, 1st Floor

#### 10:30am - 11:15am
- **AMUGEXPO and SPONSOR DEMO OPEN**
- Grand Ballroom A-C, 1st Floor

### Tuesday, April 6

#### 7:00am - 8:00am
- **Breakfast**
- Grand Ballroom F, 1st Floor

#### 8:00am - 8:45am
- **Presentation**
  - “How Digitalization Will Change the AM World”
  - Sami Gunner, Stockholm, Sweden

#### 8:45am - 9:30am
- **Presentation**
  - “Effective Ways to Manage the Combustible Dust Hazards Associated with Additive Manufacturing”
  - Jason Rice, LS Additive

#### 9:30am - 10:00am
- **Workshop**
  - “WORKSHOP: Efficiently Model the Metal AM Process with Simufact Additive”
  - Team Additive Simulation

#### 10:00am - 10:30am
- **Break**
- Grand Ballroom F, 1st Floor

#### 10:30am - 11:15am
- **Presentation**
  - “Integration of AM Technology for Face Transplant”
  - Andrew Buckland, New York University

#### 11:15am - 12:00pm
- **Workshop**
  - “WORKSHOP: In-House Procedures for Machine and Material Maintenance”
  - Team Buckland

#### 12:00pm - 1:00pm
- **Lunch Break**
- Grand Ballroom A-C, 1st Floor

#### 1:00pm - 2:00pm
- **Presentation**
  - Shane Collins, Additive Industries

#### 2:00pm - 2:30pm
- **Presentation**
  - Bill Macy, Metrology and Manufacturing Technologies

#### 2:30pm - 3:15pm
- **Presentation**
  - “Assessing the Benefits of the New Additive Manufacturing Technologies”
  - Andrew Good, New York University

#### 3:15pm - 4:00pm
- **Workshop**
  - “WORKSHOP: Metrology Open Forum Questions to the Metrology and Scanning Speakers”
  - Team Geo Hazell

### Wednesday, April 7

#### 7:00am - 8:00am
- **Breakfast**
- Grand Ballroom F, 1st Floor

#### 8:00am - 9:00am
- **Presentation**
  - “Accelerating Industrial Additive Manufacturing Towards Productivity Leadership”
  - David Flowers, Additive Industries

#### 9:00am - 10:00am
- **Presentation**
  - “Innovations in Additive Manufacturing”
  - Andrew Allshorn, 3D-Squared

#### 10:00am - 11:00am
- **Workshop**
  - “WORKSHOP: Metrology Open Forum Questions to the Metrology and Scanning Speakers”
  - Team Geo Hazell

### Thursday, April 8

#### 7:00am - 8:00am
- **Breakfast**
- Grand Ballroom F, 1st Floor

#### 8:00am - 9:00am
- **Presentation**
  - “How to Integrate AM with Manufacturing Processes to Drive Productivity”
  - Mike Bosveld, Authentise

#### 9:00am - 10:00am
- **Presentation**
  - “The Right Material for Your Application”
  - Jeroen van de Sandt, 3D Systems

#### 10:00am - 11:00am
- **Workshop**
  - “WORKSHOP: Metrology Open Forum Questions to the Metrology and Scanning Speakers”
  - Team Geo Hazell

### Friday, April 9

#### 7:00am - 8:00am
- **Breakfast**
- Grand Ballroom F, 1st Floor

#### 8:00am - 9:00am
- **Presentation**
  - “How to Integrate AM with Manufacturing Processes to Drive Productivity”
  - Mike Bosveld, Authentise

#### 9:00am - 10:00am
- **Presentation**
  - “The Right Material for Your Application”
  - Jeroen van de Sandt, 3D Systems

#### 10:00am - 11:00am
- **Workshop**
  - “WORKSHOP: Metrology Open Forum Questions to the Metrology and Scanning Speakers”
  - Team Geo Hazell
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<td>AM Supply Chain Strategy</td>
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<td>Becoming a PreForm Master: Designing for SLA</td>
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<td>Winning with Additive: An Interactive Session</td>
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<td>Industrial Applications with HP Multi Jet Fusion</td>
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<td>Paramatters Next Generation Design and Manufacturing of Motorcycle</td>
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<td>HP MultiJet Fusion</td>
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<td>Additive is Not an Island: A Systematic Approach to Processes</td>
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<td>Smart Manufacturing with Selective Laser Melting</td>
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<td>Cobalt-Chrome Tensile Response to Corrective Action Across 7 Platforms</td>
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### Conference Key
- **Beginner Session**
- ** Intermediate Session**
- **Customer Only Session**
- **Preregistration Required**
- **Advance Session**
- **Hands-On Session**
**Tuesday, April 10, 2018**

**7:00am - 8:00am**
REGISTRATION and BADGE PICK-UP
Grand Hall, 2nd Floor

**7:00am - 8:00am**
BREAKFAST
Regency Ballroom A-C, 1st Floor

**8:00am - 9:00am**
2018 SCHOLARSHIP WINNERS
2017 AMUG TECHNICAL COMPETITION WINNERS
Grand Ballroom A-F, 1st Floor

**9:00am - 1:30pm**
**30 YEARS OF USERS GROUP**
PAUL BATES, AMUG President
Grand Ballroom A-F, 1st Floor

**10:45am - 11:00am**
**BREAK and REGISTRATION OPEN**

**11:00am - 12:00pm**
**AMUG AMBASSADORS: GRAHAM TROMANS**
9:15am-10:15am
GLOBAL AM REVIEW
9:00am-9:15am
PAUL BATES, AMUG President
Grand Ballroom A-F, 1st Floor

**12:00pm - 1:00pm**
**TRANSITION**

**1:15pm - 1:30pm**
**NETWORKING LUNCH**
AMUG Epicurean Tent

**1:45pm - 2:15pm**
**TRANSITION**

**2:30pm - 4:00pm**
**3:15pm - 4:00pm**
**2:45pm - 3:15pm**
**3:30pm - 3:45pm**
**2:30pm - 3:00pm**
**1:30pm - 2:00pm**
**ROOM**
Grand Ballroom F/Frisco/Burlington
Grand Ballroom C
Grand Ballroom D
New York Central
Illinois Central
Grand Ballroom A

**4:15pm - 6:00pm**
**6:00pm - 10:00pm**
**AMUG AWARDS BANQUET | DINNER AND ENTERTAINMENT**

**5:00pm - 6:00pm**
**All Sessions Closed**

**6:00pm - 10:00pm**
**AMUG AWARDS BANQUET | DINNER AND ENTERTAINMENT**
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<td>REPEAT Changing the Injection Molding Equation with Conformal Cooling and Metal AM</td>
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<td>3D Printing Industry Needs Agnostic Material Solutions (Printing Only)</td>
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<td>Design for Digital Light Synthesis: The Evolution of a Part Design Technique</td>
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<td>Are You Getting the Best Part Accuracy Out of Your SLS Equipment?</td>
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<td>Evaluation of Support Structures by Binder Jetting: 316L Stainless Steel</td>
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<td>Going Much Faster on the Salt Flats: EBM AM High Ratio Titanium Rollers for Motorcycle Engine</td>
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<td>High Performance Part Design and Production with Additive Manufacturing</td>
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<td>The Questions Customers SHOULD be Asking about DMLS/SLM</td>
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<td>Accelerating In-Cabin Aerospace Systems with 3D Systems</td>
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<td>Implementation of AM by Adapting Conventional Design</td>
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<td>Questions About 3D Printing Liquids? Safety Datasheets!</td>
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<td>Evaluating Use-Case Scenarios and Safety Datasheets for In-office Metal 3D Printing</td>
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<td>Using New Hybrid Processes for Metal Powdered Bed AM</td>
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<td>AFIT and Metal AM: Enabling Defense Research and Development</td>
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<td>Electric Vehicle and Automotive Applications with 3D Metal AM: Lightweighting</td>
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<td>Multi-Laser AM Boosts Productivity and Reduces Part Costs</td>
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<td>High Speed Additive Printing on an SLIM2S</td>
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<td>BIA, Andy Roberts, Desktop Metal</td>
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<td>BIA, Dustin Hurst, Additive Production</td>
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<td>BIA, Joe Sinopoli, Formlabs</td>
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<td>Networking Dinner - A Taste of St. Louis - Midway East and Grand Hall</td>
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**Conference Key**

- Beginner Session
- Customer Only Session
- Intermediate Session
- Preregistration Required
- Advance Session
- Hands On Session
The Distinguished INnovator Operator (DINO) Award recognizes individuals for both their contributions and years of service within the additive manufacturing industry and within the AMUG efforts. Each year, the selection committee reviews the list of conference registrants and selects DINOs based on factors such as:

- Contributions to the AM industry worldwide
- Contributions to AMUG (e.g., speaker, volunteer)
- Years of hands-on work with an AM technology
- Willingness to share and assist
- Skill level
- And other subjective factors

These criteria make the DINO Award very prestigious.

2017 DINO RECIPIENTS

Ted Anderson
GE Additive

Carl Deckard
Structured Polymers

Jim Harrison
The Solid Experts

Peter Liacouras
Walter Reed Military Medical Center

Shannon VanDeren
Layered Manufacturing and Consulting

Bruce Bradshaw
Arcam AB

Joerg Griessbach
The SL Pro

Kim Killoran
Stratasys

Steve Murray
Hoosier Pattern

Kevin Zaras
DSM Functional Materials

AMUG DINO
PAST DINO RECIPIENTS

2016
Andrew Allshorn, At 3D-Squared, Ltd.
Ben Dolan, UC Irvine
Vito Gervasi, Milwaukee School of Engineering
Eliz-abeth Goode, Goodelnk
Mike Hascher, Eagle Engineered Solutions Inc.
Joe Holland, Hyphen
Bonnie Meyer, Stratasyx
Todd Reese, Realize, Inc.
Dan Welker, Yazaki North America
Jack Ziemba, Aristo-Cast, Inc.

2015
Vince Anewenter, Milwaukee School of Engineering (MSOE)
Derek Ellis, Computer Aided Technology, Inc.
Andrew Graves, Stratasyx Direct Manufacturing
Steven Kossett, Natural Resource Research Institute, University of Minnesota
Stefan Ritt, SLM Solutions
Harold Sears, Ford Motor Company
Ed Tackett, University of California, Irvine
Mark Wynn, Yazaki North America

2014
Mark Barfoot, Hyphen
Scott Crump, Stratasyx
Stewart Davis, CRP USA
Jason Dickman, American Precision Prototyping
Jim Reitz, Rapid Tech Consulting

2013
Chuck Alexander, Solid Concepts
Brian Bauman, Linked In 3D
Paul Bordner, Laser Reproductions
Todd Grimm, T.A. Grimm & Associates
Terry Hoppe, Stratasyx

2012
Paul Bates, Reebok
David Bourell, University of Texas
Bill Braune, Met-L-Flo
Duane Byerly, Xerox
Robert Coleman, Mattell
Roger Cunningham, Integra
Mike Littrell, CIDEAS Inc.
Jason Lopes, Legacy Effects
Frank Medina, University of Texas El Paso
Dan Mishek, Vista Technologies
Larry Monahan, Becton Dickinson
Charlie Norton, NCP Leasing
Ken Patton, RapidTech/Saddleback
Brad Palumbo, Phoenix Analysis & Design
Bradley Ruprecht, US Army
Scott Schermer, S.C. Johnson
Thomas Starr, University of Louisville
Sean Wise, RePliForm
Michael Zerbe, Newell Rubbermaid

2011
Bret Bordner, Laser Reproductions
Mike Connor, Integra
Kevan Dyer, InterPro
Bob Dzugan, buyCASTINGS
Fred Hilbrandt, FBI
Bill Lamey, Boeing
John Schaefer, DSM Somos
Greg Stein, Northrop Grumman
Xu Xiaoshu, Farsoon Hi-Tech
Arnold Zieger, Dalimer

2009
Neil Hopkinson, Loughborough University
Dr. Paul Jacobs, 3D Systems
Harold Luper, Huntsman
Steve McDonald, L3
Dave Rosen, Georgia Tech
Richard Smeenk, Agile Manufacturing
Graham Tromans, Loughborough University

2008
Mark Abshire, DSM
Denny Black, Valeo Sylvania
Chris Huskamp, The Boeing Phantom Works
Steinar Killi, Oslo School
Troy Kuhn, Chrysler
Gideon Levy, University of Applied Sciences
Ariel Lijnenstein, Robtec
Jan Richter, Solid Concepts

2007
Rick Booth, Advanced Laser Materials
Carl Dekker, Met-L-Flo
Kent Firestone, Solid Concepts
Gary Graf, University of Louisville
Bruce LeMaster, Applied Rapid Technologies
Tom Mueller, Express Pattern
Gary Rabinovitz, Reebok International
Lawrence Winnen, Tyco Electronics

2006
Joe Allison, Solid Concepts
Daniel Baker, US Army Benet Labs
Phillip Conner, 3D Systems
Renee Flynn, Paramount Industries
Soeren Griessbach, V.G. Kunststofftechni
Terry Kreplin, Baxter
R.J. Robinson, University of Kentucky
Igata Tersuzu, INCS
Georgia Theriot, GT Signature
James Williams, Paramount Industries

2005
Gregg Banyon, Delphi
Martin Colombo, ATI
Richard Davis, Motorola
Ken Davis, University of Louisville
Al DeWitt, Rapid Solutions
Mike Scanlon, Homes Group
Roger Spellman, Solid Concepts
Brent Stucker, Utah State
Scott Turner, Scicon
Rethia Williams, RMB Products

2004
Kevin Ayers, FBI
Tim Gornet, University of Louisville
David Leigh, Harvest Technologies
Jeff Smith, Moeller Design
Derrick Spaven, RPM Solutions
Bob Speer, ALCOA
Scott Sutterer, DSM Somos
Bob Zubrickie, Tyco Electronics

2003
Phill Dickens, Loughborough University
Judy Gill, Raytheon
Mark Horner, The Technology House

2001
Steve Deak, Hasbro
Beth Israelsen, Becton-Dickinson
Kevin Kennedy, Protech Engineering
Tom Sorovetz, Daimler Chrysler

2000
Dave Flynn, Express Pattern
Elaine Hunt, Clemson University
Graham Tromans, Rover Group
Doug Van Putte, Eastman Kodak

1998
Guy Bourdeau, Beckman Coulter
Rob Connelly, Becton-Dickinson
Joe DeGuglielmo, Eastman Kodak
John Mack, General Motors
Fred Steinbauer, Pratt & Whitney
AMUG - an all volunteer organization is celebrating 30 years. As an all volunteer organization, the AMUG Board works with individuals globally to increase awareness and build a strong additive manufacturing community. If you are interested in joining the expanding AMUG team, contact our Nominating Committee at info@amug.com.

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At AMUG we consider ourselves very fortunate. There are so many passionate AMUG members and industry associates that contribute to the success of pulling off a large conference managed by all volunteers. We would like to take a moment to say thank you to everyone that participated in the 2018 AMUG Education & Training Conference. We truly appreciate your continued support and dedication.

CIDEAS – special projects
Dinsmore – Production of train car containers
JJ Jinkleheimer – awards and clothing
Mathew Mitchell – CAD production
MSOE – printing of DINOs
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Don’t let anyone fool you. It takes a lot to put on a large conference year after year (not to mention control this rowdy group) and we are continually improving our processes, and expanding our team to meet the growing demands of the AM community. This year we introduced a number of committees and members that participate as non-board members to ensure your experience and education is continually improved upon. If you are interested in becoming a board member, volunteer, or sit on one of our very active committee teams, contact us at info@amug.com. Thank you to all our volunteers and committee members.

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