



# ADDITIVE MANUFACTURING CHAPTER

## Mission

The mission of SPE Additive Manufacturing (AM) / 3D Printing (3Dp) Chapter is to provide a forum to present, promote and educate the SPE community in AM/3Dp in the following areas:

- Material Development
- Equipment
- Process Technologies
- Product Design
- Mold & Mold Making
- Marketing
- Research & Development.



Photo courtesy of Stratasys



Photo courtesy of HP

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## Message from the Chair



First and foremost I would like to thank the past president David Tucker for all that he has done over the past year with our Additive Manufacturing Chapter. He has taken it to a place where it makes it easy for me to set up this upcoming year!

There has been a lot of innovation in our industry this past year. All of it is very exciting; however, it can be extremely overwhelming which is why I am very excited for this upcoming year for our Chapter. We have added some amazing people to our Board, and I am confident we will all push forward our efforts that have been defined by me for this upcoming year as "**A.C.E.: Awareness, Content & Events.**" I feel it's extremely important to keep growing and expanding our knowledge library and make it as streamlined as possible for technical content to be available and easily digestible to all of our SPE plastics industry peers. We want to bring that knowledge to in-person events. This is our responsibility to all plastics professionals.

I have been involved with Additive Manufacturing for almost 19 years at this point, and I am just as excited as I was when I saw my first part raising up on a build tray. My experience spans from entertainment, action figures & collectibles all the way through full applications at high volumes with Additive Manufacturing.

## Board of Directors



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LyondellBasell



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## Message from the Chair (continued)

We have known the capabilities from the prototyping perspective for years but now we are at a point where this technology is crossing boundaries into new areas of volume production, whether it be Automotive, Industrial, Medical or even my wheelhouse of Entertainment. I am sure all of our diverse Board members will help show how to navigate the full potential of Additive Manufacturing for any possible needs out there!

Jason Lopes  
SPE AM Chapter Chair  
7/1/2022-6/30/2023 Term Year

## Board News

Since our last newsletter issue, several Board of Directors members have stepped down and others have joined the Board.

### *Warm Welcome to the following new Board Members:*

- Bob Gafvert joined the Board in July 2022. He is a Business Development Manager and the Chief Evangelist for 3D/Additive Solutions at Diversified Plastics, Inc., and he had previous experience at Carbon and in the plastics industry. Bob leads the Sponsorships efforts for the Board.
- Emily Hunt also joined in July 2022. She is a Product Manager at Prima Power Laserdyne, and she has previous experience at Stanley Black & Decker and Stratasys. Emily serves as the Webmaster for the Board.
- Ray Schenk also joined in July 2022. Ray is a Senior Sales Engineer at Diversified Plastics, Inc., with twenty years of experience using 3D printing. He serves as Content Curator for the Board.

### *Thank You to the following former Board members:*

- Victor Jaker, Materials Development Manager at Stratasys, stepped down from the Board in April 2022. Victor served on the Board from 2017-2022. Thanks for all of the years of service.
- Jennifer Howe stepped down from the Board in April 2022. She recently started a new position as Sr. Sales Director for SPEE3D. She served from 2020-2022,

**Board of Directors continued**Ellen Lee, PhD  
Ford Motor  
CompanyJason Lopes  
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Materials AmericaDavid Tucker  
MasterGraphicsShu-Kai Yeh, PhD  
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Science and  
Technology**Membership Information**

The current total membership for the SPE Additive Manufacturing Chapter is **2,132 members**.

Not an SPE AM Chapter member?

**Join today for free!**

Membership to the AM Chapter is free and can be added when you enroll or renew your SPE society membership: [www.4spe.org](http://www.4spe.org)

**Board News (continued)**

- [Jennifer Howe] including as Social Media Ambassador throughout that time. Thank you Jennifer for your service to the Chapter over the past two years.
- Dana McCallum, VP of Sales for Mantle, Inc., stepped down from the Board in June 2022. She served from 2019-2022, including as Newsletter Editor and Vice Chair/co-Technical Program Chair (TPC). Thanks Dana for your service to the Board.

Several Board members have changed positions or had other noteworthy activities in the AM field.

**Changes in Positions:**

- Feng Cai moved to [LyondellBasell](#).
- Drew Davis moved to the [US Veterans Affairs \(VA\)](#).
- Halyanne Freedman moved to [Alloy Enterprises, Inc.](#)
- Jason Lopes moved to [Gentle Giant Studios](#).
- Mike Schorr was promoted to Director of Application Consulting, [DyeMansion](#).
- David Tucker moved to [MasterGraphics](#) and [New Wave Mfg.](#)
- Shu-Kai Yeh was promoted to Professor, Materials Science and Engineering, [National Taiwan University of Science and Technology](#).

**Notable Awards & Activity:**

- Ellen Lee was a finalist for the TCT Women in 3D Printing Innovator Award and presented a keynote talk at AMUG 2022, in addition to several other recognitions recently through SME, Wi3Dp, etc.
- Matthew Thompson published “Current status and future roles of additives in 3D printing – A perspective” in SPE’s Journal of Vinyl & Additive Technology, Vol. 28, Issue 1, first published online January 3, 2022: [onlinelibrary.wiley.com/doi/abs/10.1002/vnl.21887](http://onlinelibrary.wiley.com/doi/abs/10.1002/vnl.21887).

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## Event Information

The SPE AM Chapter has assisted to curate content for several events since our last newsletter issue. We are available to co-host events and collaborate with other SPE and AM industry groups.

### 2022 SPE Auto EPCON



The SPE AM Chapter co-hosted the 2022 Automotive Engineering Plastics Conference & Exhibition (Auto EPCON) with the SPE Detroit Section and the SPE Injection Molding Division. The event was held on May 3, 2022, at the Detroit Marriott Troy in Troy, MI. The conference featured four (4) parallel tracks of technical talks on topics such as Additive Manufacturing, Sustainability, Electrification of Vehicles, What Automotive Can Learn from Aerospace in Low-Volume Scalable Manufacturing, and others.

More information may be found at [4spe.org/autoepcon](https://4spe.org/autoepcon). The AM track featured the following:

<i>Time</i>	<i>Talk Title</i>	<i>Speaker</i>	<i>Speaker Affiliation</i>
-	Moderators	Daniel Pisarski; David Tucker	Ford; Stanley Black & Decker
9:20-9:45	Cost and Sustainability Comparison of Injection Molding With 3D and Injection Printing	David Kazmer, PhD	University of Massachusetts-Lowell
9:45-10:10	Liquid Crystalline Polymer Reinforced Wholly Thermoplastic Composites	Cailean Pritchard, PhD	Virginia Tech
10:10-10:35	3D Printing From SKY to Drive	Walter Thompson	SABIC
11:00-11:25	PPG ARE 3D Printing Materials	Cindy Kutcho	PPG
11:25-11:50	Advancements of Photopolymer Resins for Additive Manufacturing	Brian Durand	Henkel Loctite
1:20-1:45	Fused Filament Fabrication vs Fused Granulate Fabrication (Direct Pellet Printing)	Gregory Costantino	Covestro Additive Manufacturing
1:45-2:10	Charging Up With Additive Manufacturing	Fadi Abro	Stratasys
2:10-2:35	Precision Metal 3DPrinting: A New Opportunity for Moldmakers and Molders	Paul DiLaura	Mantle, Inc.
3:30-4:30	Panel Discussion: How and When to Choose an AM Solution	Moderator: Pete Zelinski	Additive Manufacturing Magazine
		Opening Comments: Ellen Lee, PhD	Ford
	Panelists:	Rebecca Fecteau	BASF 3D Printing Solutions NA
		Fadi Abro	Stratasys
		Charlie Wood, PhD	Fast Radius
David Kazmer, PhD	University of Massachusetts-Lowell		

## 2022 SPE ANTEC®



SPE hosted its annual technical conference ANTEC® 2022 in Charlotte, NC, June 14-16, 2022, co-located with PLASTECS® South, an Informa event. Returning to an in-person format, the conference featured a series of keynotes, SPE leadership roundtable, NASCAR reception, and two days of technical sessions with three (3) parallel tracks each.

More information may be found on the [4spe.org](https://www.4spe.org) website. AM/3Dp talks included the following (associated papers were also published in the conference proceedings):

<i>Time</i>	<i>Talk Title</i>	<i>Speaker</i>	<i>Speaker Affiliation</i>
8:30-9:00	Compressibility in Fused Deposition Modeling	David Kazmer, PhD	University of Massachusetts-Lowell
9:00-9:30	Development of an Agile, Battlefield Additive Manufacturing Plant for Recycled Polyethylene Terephthalate (rPET)	Prabhat Krishnaswamy, PhD	Engineering Mechanics Corporation of Columbus (Emc <sup>2</sup> )
9:30-10:00	Curing Behavior Simulator for Robotic 3D Printing of UV-Curable Thermoset Polymers	Genevieve Palardy, PhD	Louisiana State University
10:00-10:30	Improving Part Properties During Injection Molding With 3D Printed CO <sub>2</sub> Cooled Plastic Mold Inserts	Ruben Schlutter, PhD	University of Applied Sciences Schmalkalden
10:30-11:00	Turnkey Solution for 3D Metal Printed Conformally Cooled Injection Mold Inserts	Gaurav Vadlamudi	Instaversal
11:00-11:30	Potential of Five-Axis Kinematic Systems for Additive Manufacturing Using Fused Deposition Modelling (FDM)	Joshua Voll, PhD	Hochschule Schmalkalden
11:30-12:00	Investigating the Processing of Stimuli-Responsive Cellulose Nanocrystal Polymer Composites In Graded 3D Printing	Yimin Yao	Virginia Tech

2022 SPE ACCE



The SPE AM Chapter assisted with paper reviews for the AM/3Dp contributions to the 2022 Automotive Composites Conference & Exhibition (ACCE). The event is hosted by the SPE Automotive and Composites Divisions and was held September 7-9, 2022, in Novi, MI.

The AM track featured the following:

Talk Title	Speaker	Speaker Affiliation
Experimental Validation of Deformation Predictions for Large Scale Additive Manufacturing	Eduardo Barocio	Purdue University
Improving Mechanical Properties of 3D Printed SHort Glass Nylon Composites Using Isostatic Compaction	Alex Kravchenko	Old Dominion
MicroCT Evaluation of Bead Microstructure for Large Area Additive Manufacturing Polymer Composite Deposition	Neshat Sayah	Baylor University
Minimizing Warpage of FDM Parts	Dustin Souza	Hexagon
Quantitative Inspection of Internal Raster Orientation of Additively Manufactured Components via Ultrasonic Nondestructive Testing	Atik Amin	Baylor University
Application of Thermoset Polymer Coating with Ceramic Particle to Additively Manufactured Carbon Fiber Reinforced Thermoplastic Composite Tooling	Kim	Baylor University



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## 2022 AMUG

The Additive Manufacturing User Group (AMUG) hosts one of the premier events for the AM/3Dp industry every spring. The 2022 AMUG was held April 3-7, 2022, in Chicago, IL. More information can be found at [amug.com](http://amug.com).

This year, Ellen Lee was invited to give a keynote talk. She shared her perspective from the podium:

“

It was wonderful getting back together with peers from around the additive manufacturing community at AMUG this year! Because travel restrictions kept me from attending the conference last year in Orlando, it had been three years since I had last been at AMUG.

The energy, discussions, and idea exchange were all ramped up from years past. I was pleased to see that there was much more discussion and focus on use of AM for production applications, including discussion about qualification and certification requirements, as well as how to get to scale. And importantly, many were talking about the need to improve sustainability – both by using AM and for the AM materials and processes themselves.

We had good representation from the automotive sector with both conference keynotes coming from our industry. Kevin Czinger from Divergent 3D and Czinger Vehicles talked about the innovation behind the 21C Hypercar using Divergent Adaptive Production System (DAPS) to enable digital manufacturing and improve manufacturing efficiency and vehicle performance. Divergent has positioned itself to be a Tier 1 supplier for the auto OEMs (including Czinger Vehicles) and Czinger noted that attaining qualification for this status was no small feat. While the 21C has a price tag of \$2M with a lifetime volume of 80 vehicles, we need to remember that many technologies that we all have in our vehicles today started out in racecars and took time and work to get them to be affordable to all. In order to scale for automotive, we need not only to work together in the AM community accelerate technology advancements but we also need to focus on how to design and integrate systems in order to get value that was not achievable by conventional means. When I delivered my keynote, I emphasized the influence of the automotive industry on the manufacturing

landscape, noting that due how ubiquitous cars and mobility are to our everyday lives what we do can help bring in technologies that are important across all manufacturing sectors. Throughout history, Ford has had such significant impact because of our focus on scale and bringing cars and technologies to the masses.

Both Ford and GM also delivered presentations to give insight about automotive use of AM. Ford stepped through the process we use to validate a material and process to “applications readiness” and “implementation readiness”. GM took attendees through their process for application selection. Not only do we need to assess whether AM can be used, we need to assess whether it should be used, taking into account the economics and the full value chain.

Finally, I wanted to reflect on the state of DEI in AM. While we had noticeable improvements in the number of women and other underrepresented minorities in attendance and in leadership roles, there continues to be a significant gap. I felt it was my duty to stand up on the mainstage to show more diversity and to use intentional language to make a point – representation matters; words matter. But while representation and words are a good start, even more important are the actions of people and groups like Women in 3D Printing and its allies and advocates. I’ve been continuously impressed by the efforts of my colleagues who continue to ensure that we make forward progress towards a more diverse and inclusive AM industry.”



Ellen Lee, PhD  
Ford Motor  
Company



### *Activity with Other Additive Manufacturing Groups & Conferences*

To fulfill our Mission (see cover page) and our goal to educate plastics professionals about additive manufacturing (AM) and the 3D printing industry about plastics, the SPE Additive Manufacturing Chapter strives to collaborate with other SPE chapters and other groups & conferences in the AM field.

Our AM Chapter has a close relationship with Women in 3D Printing (Wi3Dp). Several Board members serve in both groups. We co-hosted a happy hour in Chicago in April 2022. Several of our Board members also serve in other SPE chapters and other professional societies like Society of Manufacturing Engineers (SME), Society for the Advancement of Materials & Process Engineering (SAMPE), and others.

As already shown throughout this newsletter, our Board members also participate at a high level in the other conferences and trade shows in the AM industry, including RAPID + TCT, AMUG, and Formnext (see photo). Please chat with us when you see us, and better yet, connect on LinkedIn and schedule a meet-up.

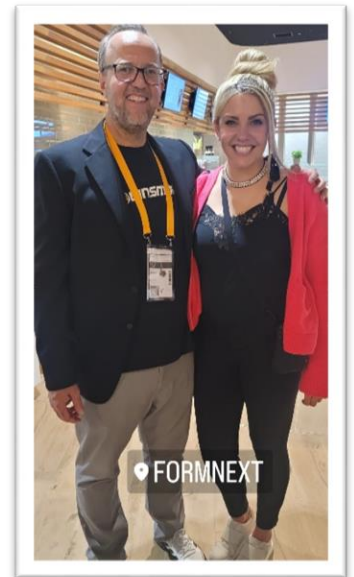


Photo courtesy of Haleyanne Freedman

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## ADDITIVE MANUFACTURING CHAPTER

### Join or Renew Your Membership



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If you are an SPE member, it is **free** to join the SPE AM Chapter!

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VINYL & ADDITIVE  
TECHNOLOGY

## Call for Papers

SPE's *Journal of Vinyl & Additive Technology* (JVAT) announces a call for papers for an upcoming special issue on

**The Role of Additives in Rheology and Processing** which will focus on the use of additives in polymer materials to modify the flow properties of the material to optimize processing into intermediate materials and useful parts.

Themes include but are not limited to:

- Nanofillers
- Processing aids
- Compatibilizers and reactive processing
- Flow enhancers
- Specially engineered materials, e.g., smart materials, bio-materials, and tribological materials

**Timeline:**

Special issue publication date: Early 2023

**How to Submit a Paper:**

Papers may be submitted through the normal submission portal accessed from the JVAT website: [onlinelibrary.wiley.com/journal/15480585](http://onlinelibrary.wiley.com/journal/15480585).

**Guest Editors:**

Rakesh K. Gupta, [rakesh.gupta@mail.wvu.edu](mailto:rakesh.gupta@mail.wvu.edu)

Matthew S. Thompson, [matthew.thompson@toraycma.com](mailto:matthew.thompson@toraycma.com)

## Call for Sponsors

The **SPE Additive Manufacturing (AM) Chapter** invites you to take advantage of an opportunity to capture advertising space in our outgoing communications to our **>2,100 members**. Help align your company's image with advanced technology and future trends by submitting your logo or designed ads which will feature on the SPE AM Chapter website, newsletter, and other communications.

**Sponsorships include ad space in our newsletter and on our website** ([speadditivemanufacturing.org](http://speadditivemanufacturing.org)). **Sponsoring companies' logos may also be featured in other outgoing communications**, which will add marketing value to the companies and bring color to our content. Please also reach out to us if you have educational content, such as published articles or white papers, that you feel our membership would benefit in reading.

Sponsorship options start from \$100. Rates cover the entire SPE term year (July 1 - June 30). Payments are handled through [4spe.org](http://4spe.org), and **credit card payments are accepted**. Size limit for digital file is 700 kB.

**Reach out to discuss Sponsorship options and opportunities:** Jason Lopes, SPE AM Chapter Chair, [jason.lopes@gentlegiantstudios.com](mailto:jason.lopes@gentlegiantstudios.com).