AMPHORA
by Eastman

Taking additive manufacturing mainstream

Virginia Tech students explore the possibilities with Eastman Amphora™ 3D polymer

Additive manufacturing is becoming easier and more prevalent than ever. But for the 3D revolution to be truly meaningful, it must move beyond industrial prototyping or something just for hobbyists.
To showcase the potential of 3D printing as a mainstream means to create viable and functional products for real markets, Eastman joined Mass Portal and colorFabb in sponsoring a 3D printing challenge for students at Virginia Tech's School of Architecture & Design and College of Engineering.

Mass Portal donated the 3D printers, and colorFabb provided the filament made from Eastman Amphora™ 3D polymer AM1800, a low-odor, styrene-free choice that is uniquely suited for additive manufacturing applications.

The goal was to prove that a functional filament makes all the difference in creating useful 3D products. The task for Virginia Tech's best and brightest was to design products that solve real-world problems. The teams needed to create a prototype as well as a presentation that describes the product, the rationale for creating it, the problem it solves, and how it leverages the advantages of Amphora.

Eight teams got to work. The results were prototypes for a golf grip trainer, an ergonomic computer mouse, a glove that can house biometric sensors, a finger splint, sunglasses frames, a rotating trivet, an insulated water bottle, and a protective athletic cup—all customized

colorFabb

MASS PORTAL

Form follows function

In an engineering field dictated by the notion that the shape of a product should be based on its intended purpose, customization is a sweet spot for the burgeoning additive manufacturing industry. Unlike mass manufacturing, 3D printing allows for one-off manufacture of products made to personal specifications.

As it turns out, the two winning entries sported similar forms for very different functions.

The team consisting of students Lane Smith, Nathan Sharpes, and Ricardo Cruz was awarded for its computer mouse shell. The team spearheaded by Courtney Tamaro, Roshelle Wijeratne, and Nicole Norris was recognized for its work developing custom protective athletic cups.

As presented by the mouse team, "With the increased amount of computer-based work, the amount of fatigue related to hand injuries has also increased . . . . Traditional manufacturing methods and current 3D scanning technologies limit the level of achievable customization." Their solution used "a computer vision algorithm and additive manufacturing to create a custom mouse shell based on the user's hand dimensions." The product would be based on a smart phone app that translates a photo of the user's hand into CAD model.

With no personal experience to go on, the women who developed the protective athletic cups interviewed more than 80 male athletes who said cups are uncomfortable, lack sizing options, and impede performance. The team developed a 3D printed solution that offered customization of not only size but also venting, color, and personalization.

Both products need to exhibit a desired durability, whether in defense of direct impact or repeated use. As cited by the teams, Amphora offers the toughness required for truly functional products. Because the two winning products require a certain amount of skin contact, both teams cited Amphora's BPA-free manufacture as an advantage as well as its dishwasher compatibility for easy cleaning.

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Shaping new markets

"The future of additive manufacturing looks bright, especially because it's going to be advanced by the kind of students we see at Virginia Tech," said Alex Dudal, market development manager at Eastman and one of the judges at the VT challenge. He continued, "They all have a keen understanding of the design, engineering, and materials necessary to make 3D printing viable."

According to Dudal, what impressed the judges about the winners was their thoroughness in trying to develop not just a design but a business model as well.

"In a short amount of time, they identified opportunities, researched customized solutions, crafted elegant yet functional designs, determined costs, and tested their prototypes," said Dudal. "It's exciting to introduce a material like Amphora to aspiring designers and engineers like those we met in Blacksburg."

About Amphora

Eastman Amphora™ 3D polymer is a low-odor, styrene-free choice that is uniquely suited for 3D printing applications, empowering designers to make truly functional items with an attractive gloss, vibrant colors, and excellent toughness and temperature resistance.

It exhibits a high melt temperature but is printable at 240° to 260°C. Its low shrinkage leads to better warping performance. And with good dimensional stability, Amphora delivers advanced bridging capabilities to create stronger and more detailed items—all with low odor and low emissions.

Amphora also complies with certain U.S. Food and Drug Administration (FDA) regulations for food contact applications.

To find out where to buy or for more details, visit **EastmanAmphora.com**.

Challenge participants from Virginia Tech's School of Architecture & Design and College of Engineering: Adam Bujnowski, Alex Kinney, Alex Matta, Benjamin Lutz , Celeste Greenbaum , Courtney Tamaro, David Holmes,, Elizabeth Park, Gabriella Jacobsen , Gerrold Walker, Jimmy Kuhn, Jordan Winkler, Kevin Chee , Lane Stith, Mark Traverso, Matt Schmidt, Nathan Sharpes, Neil Slinde, Nicole Norris, Ricardo Cruz, Roshelle Wijeratne, Saish Tedia, Stephen Shickel, Yuanyuan Jiang

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