



## Testing Without Limitations

Researchers at Embry-Riddle Aeronautical University have embarked on an ambitious project – creating a self-contained, cost-effective, 3D printable heat sink by combining phase-change materials with plastics. The Composer Filament Maker is taking them closer to making that vision a reality.

**“3devo’s filament maker allows us to easily shift between materials, without the limitation of complex polymers holding us back. We have mixed various materials together such as phase-change materials mixed with HDPE and PLA.”**

Sandra Boetcher

**Associate Professor of Mechanical Engineering at Embry-Riddle**

## Making 3D Printed Heat Sinks a Possibility Background

Ranking among America’s top aviation schools since 1925, Embry-Riddle Aeronautical University offers a variety of programs in aviation, applied science, engineering, computers and business. Its Mechanical Engineering Department is currently involved in groundbreaking research on battery cooling systems.

Here, researchers are using the 3devo Composer Filament Maker to mix plastics and phase-change materials (PCM) into high-quality filament that can potentially 3D print lightweight, self-contained heat sinks.

## **Challenge**

To realize their vision of developing 3D printable heat sinks, Embry-Riddle researchers needed PCM-based filament that could hold a stable shape. They tried creating PCM-plastic composites using a filament extruder from a leading desktop extrusion company. But this machine could only let them achieve 20% PCM in their filament. It also did not offer the quality or customizability they needed.

## **Solution**

After considering all available alternatives, the researchers picked the 3devo Composer Filament Maker for several reasons. Firstly, it let them produce high-quality filament with excellent diameter control, even when working with non-typical materials. It also enabled experimentation with different PCM ratios and a variety of plastics. Further, it was the most cost-effective option available, meeting all their requirements without the need for any add-ons.