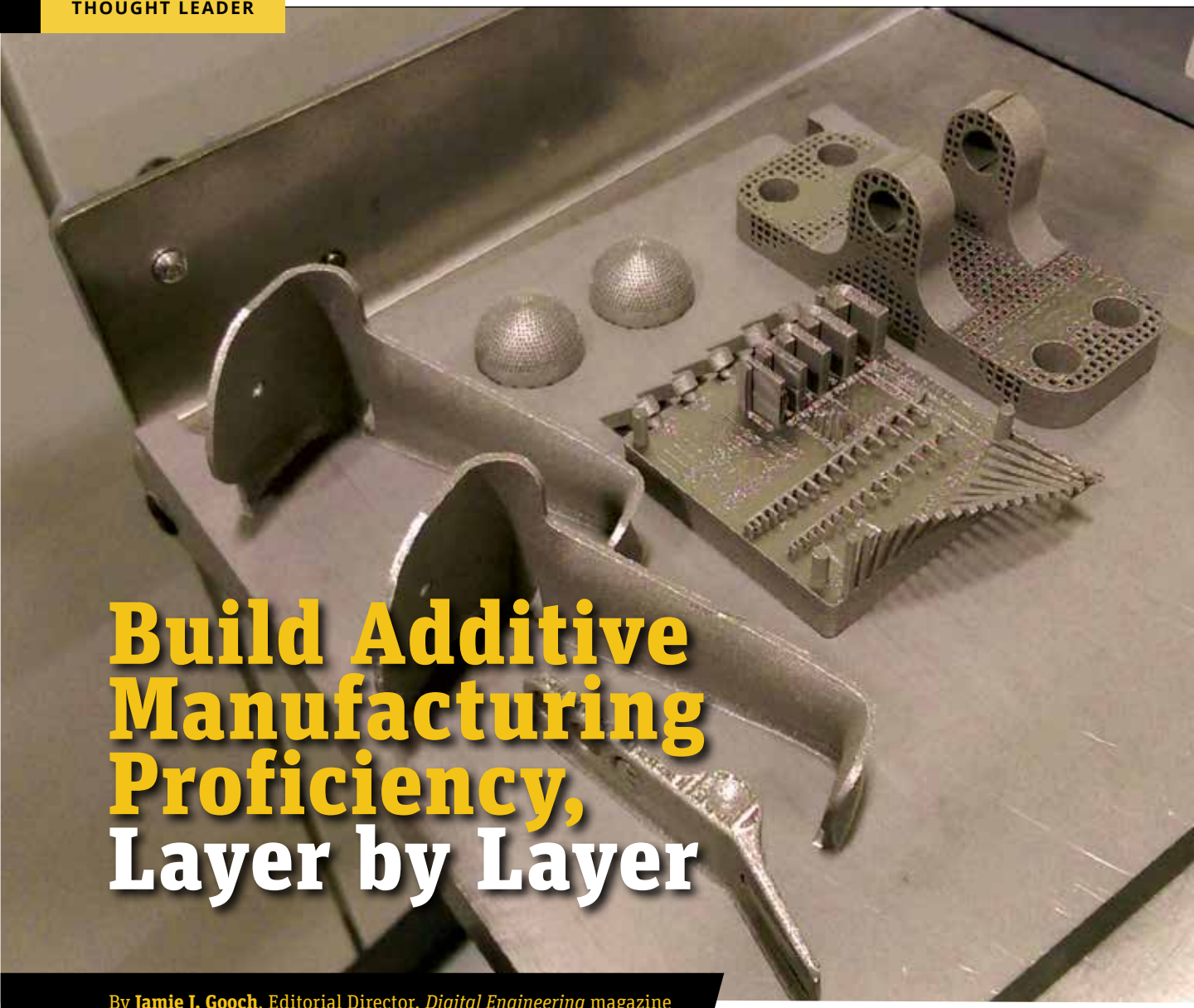

Build Additive Manufacturing Proficiency, Layer by Layer

By **Jamie J. Gooch**, Editorial Director, *Digital Engineering* magazine

Photo courtesy Dr. Albert To, University of Pittsburgh

History has been measured by how our ancestors made their tools — from the Stone, Bronze and Iron ages through the Industrial Revolution and into the Information Age. Each breakthrough in toolmaking technology ushered in technological innovations across the spectrum of human activity. That is one of the reasons that people get so excited about additive manufacturing. It has the potential to make an impact on society in countless ways, some not even thought of yet.

Look a little more closely, however, and you'll find that the historical breakthroughs were sometimes millennia in the making. People were forging metal 6,000 years ago, but it took the invention of the steam engine to really jump-start the process. At less than 40 years old, additive manufacturing has expanded into industrial uses at a breakneck pace by comparison. Not a week goes by that we don't hear about new uses, techniques and/or investments regarding industrial additive manufacturing.

Picking up Steam

Many innovations have converged to propel additive manufacturing forward at such a rapid pace — materials, robotics and sensors, to name a few. However, the steam engine that really enables additive manufacturing to move out of research facilities and onto factory floors is software.

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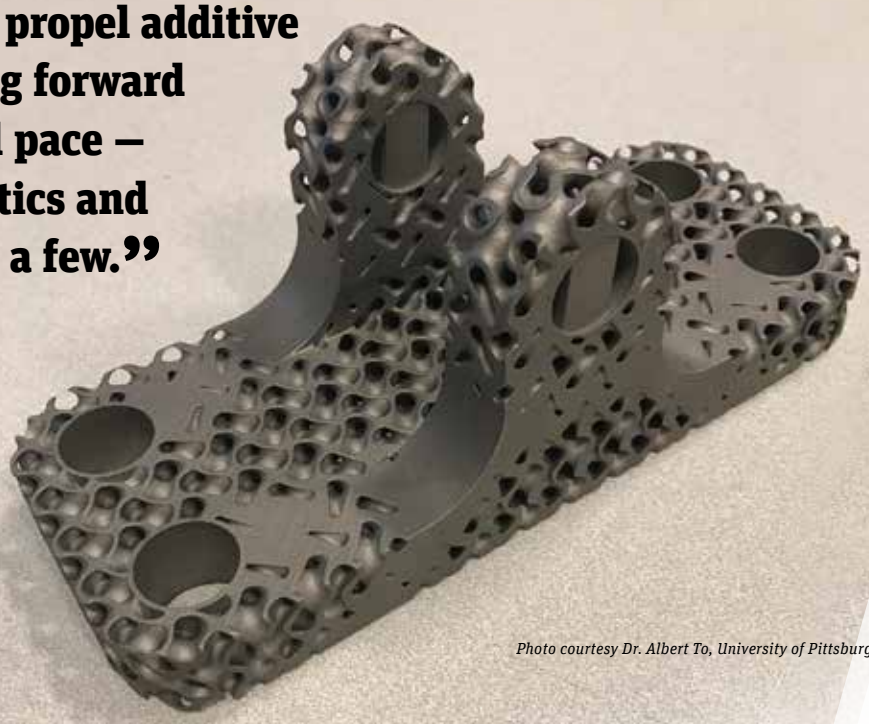

Photo courtesy Dr. Albert To, University of Pittsburgh

Designing for additive manufacturing requires a different mindset than for traditional manufacturing processes. From details like overhangs, support structure placement and part orientation to bigger decisions like whether additive manufacturing is even the right choice for a given application, what materials to use or how parts can be consolidated and optimized — it can be overwhelming.

Design engineering teams who have spent decades accustomed to the ins and outs of milling or injection molding might be inclined to stick with the status quo if they don't have the right tools and training. Or, even worse, they may decide to make an initial trial of additive manufacturing based on rumors of push-button production, only to be sorely disappointed and abandon their efforts.

Make the Cultural Connection

Software is so important because it is how we connect to the hardware, make sense of the variables and fit additive manufacturing into existing product design, development and manufacturing workflows. Many voids in the additive manufacturing process have been filled with tools focused on preparing existing files, designing for additive manufacturing from scratch, determining when to outsource to a service provider, ensuring efficient use of print bed space, simulating specific additive processes, and understanding how design changes will affect a build.

There is still more progress to be made on the additive manufacturing software front before it rivals what is available for other manufacturing processes. However, we've turned the corner from design engineering teams asking "Why isn't there software to help me do this?" to "Which software should I choose to do that?"

Like a continuous build, the layers of additive software, hardware and number of people who know how to use them keep growing, bringing shape to its future. If you aren't one of those people, take another look at additive manufacturing. The progress made on the software layers in just the last few years may surprise you, and the progress that will be made in the next few years may leave you behind if you don't.

Gooch is editorial director of* Digital Engineering *magazine (digitaleng.news), which is read by design engineering teams who want to learn about technologies to optimize the product design and development process.