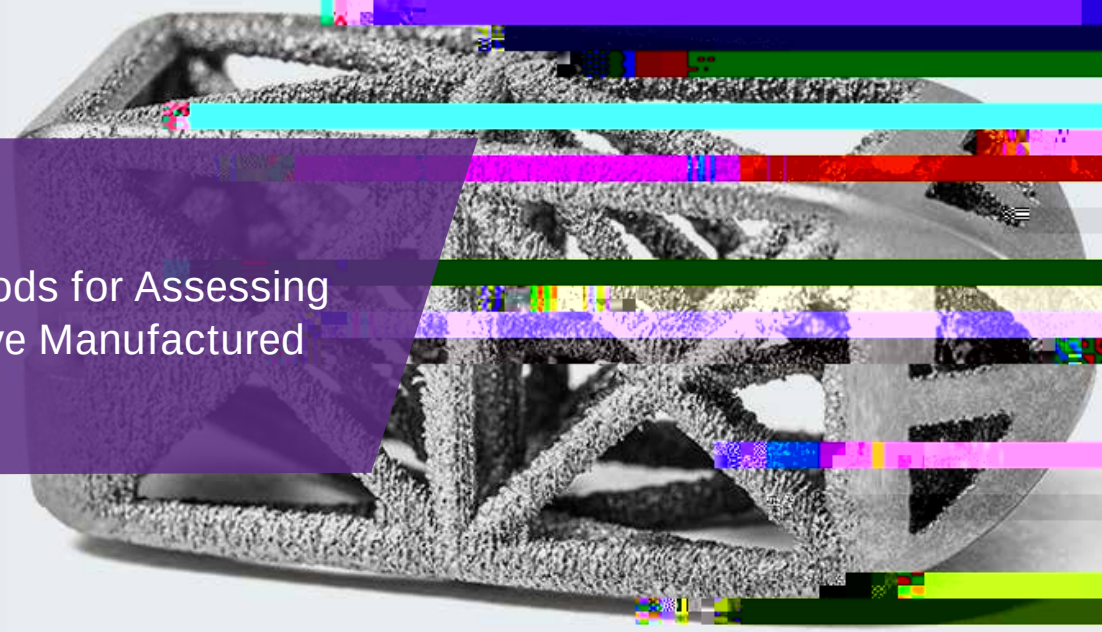
3D Image-Based Methods for Assessing Performance of Additive Manufactured Spinal Implants



“We’ve seen quite a bit of interest in assessing differences between as-designed and as-manufactured parts. It’s now possible to scan a manufactured item, create a model with Simpleware, and compare it to the original design. We simulate the behavior of the manufactured product and assess whether it will function as originally intended. If it doesn’t, engineers can make corrections to the manufacturing process or adjust the design so the final product meets all expectations.”

Thanks to:

- Workflow bridges CT, image processing, and FE simulation
- Analysis of as-manufactured implants reveals deviations from as-designed part
- Simulation in SIMULIA™ Abaqus enables minimization of functional differences in parts
- Proof-of-concept closes design loop from original models to actual parts for clinical applications
- Methods effective at handling complex anatomical and CAD data

Spinal fixation is a standard of care for patients who suffer from traumatic and chronic injuries that affect mobility and cause increased pain. Additive manufacturing (AM) provides one solution for patient-specific orthopaedic devices, enabling a wider set of inputs and design choices than traditional production. However, there are still questions about workflow efficiency, quality assurance and the validation of parts.

AM particularly creates questions over accuracy, quality, strength, and part reliability, requiring comparison of original designs and as-manufactured parts. 3D imaging technologies like industrial computed tomography (CT) are useful here for allowing comparative evaluation and reverse engineering of parts as computational models to study factors such as porosity and dimensional deviations. These methods were