3-D printing achieves more accurate and precise physical models from patient imaging data

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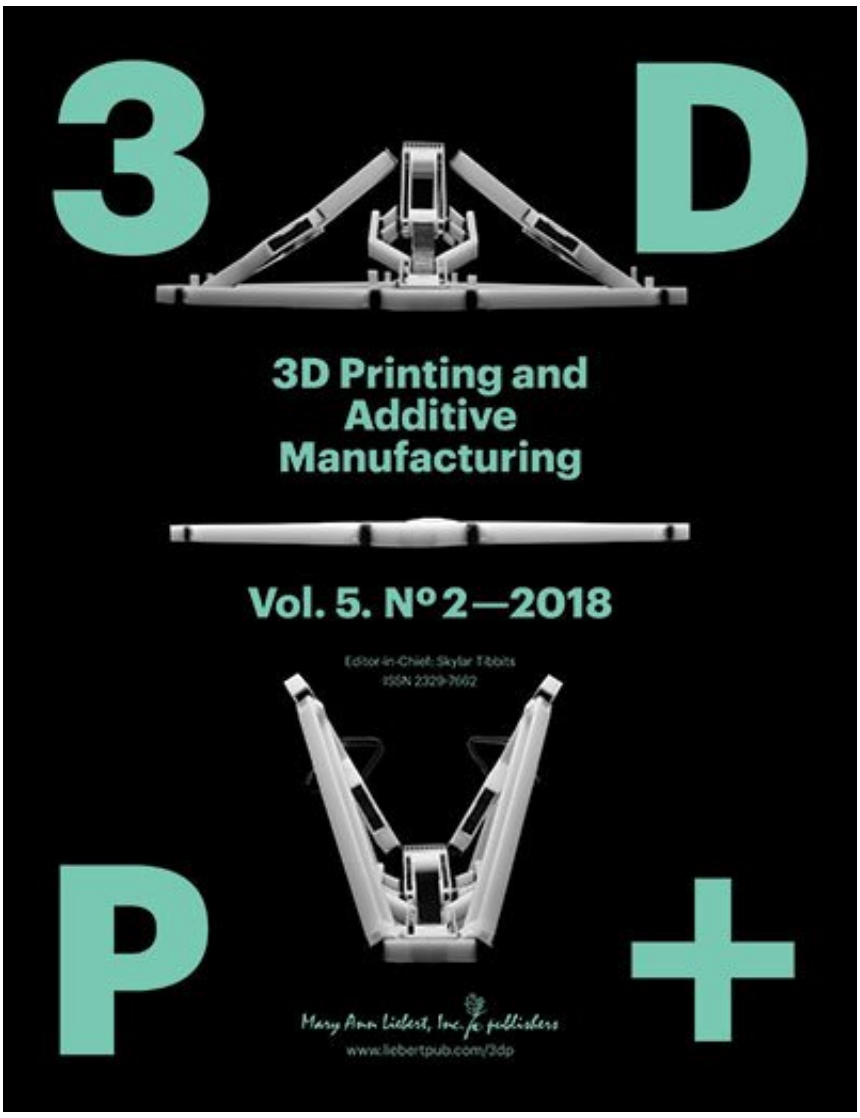

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Prior to performing a medical procedure, physicians are increasingly relying on access to 3-D printed models created using patient-specific medical data. Unfortunately, current 3-D data processing workflows can be extremely time consuming, and frequently, the resulting 3-D-printed models fail to accurately depict the anatomical details of interest. Motivated by these inherent limitations, an international team of researchers describes a rapid method for creating extremely detailed physical models directly from volumetric data stacks in an article published in *3-D Printing and Additive Manufacturing*.

The article entitled "From Improved Diagnostics to Presurgical Planning: High-Resolution Functionally Graded Multimaterial 3-D Printing of Biomedical Tomographic Data Sets " is coauthored by James Weaver, Wyss Institute for Biologically Inspired Engineering, Harvard University (Cambridge, MA) and colleagues from MIT (Cambridge, MA), Massachusetts General Hospital and Harvard Medical School (Boston, MA), University of Washington (Seattle, WA), Brigham and Women's Hospital (Boston, MA), Isomics (Cambridge, MA), Universitätsmedizin Berlin (Germany), Beth Israel Deaconess Medical Center (Boston, MA), and Max Planck Institute of Colloids and Interfaces (Potsdam, Germany).

The bitmap-based workflow relies on the use of cross-sectional image stacks—images acquired for diagnostic purposes or in advance of a surgical procedure, for example. These bitmap slices can be processed using standard photo editing workflows and are then fed directly into an ink jet-like 3-D printer, resulting in extremely detailed physical models with the ability to incorporate grayscale, transparency, or mechanical property gradients, and thus more closely mimic the patient's specific anatomy.

More information: Ahmed Hosny et al, From Improved Diagnostics to Presurgical Planning: High-Resolution Functionally Graded Multimaterial 3D Printing of Biomedical Tomographic Data Sets, *3D Printing and Additive Manufacturing* (2018). DOI: 10.1089/3dp.2017.0140

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