THE APPLICATION OF MICRO-COMPUTER TOMOGRAPHY AND 3D PRINTING TO THE STUDY OF FOSSILS

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ABSTRACT

The union of several technologies has enabled a new format for studying fossils. Traditional preparation methods require the fossil to be extracted from the surrounding matrix, often resulting in minute but cumulative physical damage to the specimen. Facilitating collaborative research often requires transporting the fossil with the obvious associated hazards. New imaging equipment allows for digital reconstruction of a fossil encased within matrix, and 3D printing provides a mechanism for recreating the fossil shape in plastic. SDSM&T’s new Micro-Computed Tomography (MCT) machine, Xradia XCT-400, is utilized to image the specimen into layered x-ray images. Visualization Science Group’s Avizo Fire and 3DS’s SolidWorks are used to render and transform layers of interest and remove others. Finally, Makerbot’s 3D printer and software print the replicated sample by extruding thin strips of plastic on a movable platform. Difficulties with using these technologies include: fossil quality, the MCT’s sensitivity to fossil densities in lithified samples, software compatibility to data formats, and resolution of the sample to be printed. The techniques developed to overcome these obstacles are also applicable to tasks requiring a non-destructive evaluation of manufacturing quality control or counterfeit analysis.