# Multi-Flash 3D Photography: Capturing Shape and Appearance Supplementary Material

Douglas Lanman * Peter G. Sibley † Daniel Crispell * Yong Zhao * Gabriel Taubin *
Brown University

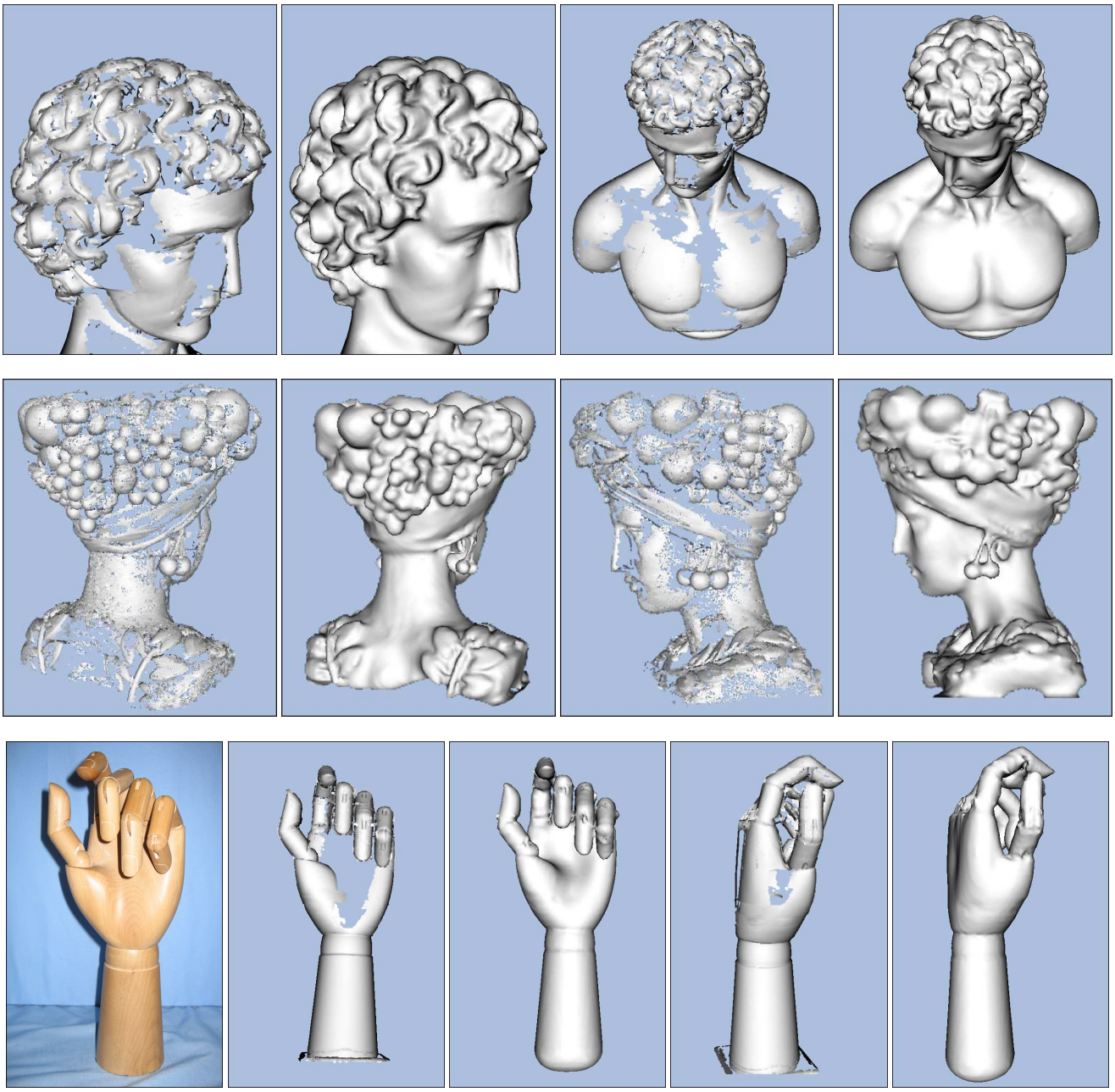

Figure 1: Summary of oriented point cloud and implicit surface reconstruction results. Top row: two aligned pairs of estimated point clouds (1M points) and polygonal mesh reconstructions (220k faces) for the bust model. Center row: two pairs of estimated point clouds (1M points) and polygonal mesh reconstructions (110k faces) for the woman with fruit basket model. Bottom row: an input image of the hand model followed by two aligned pairs of estimated point clouds (600k points) and polygonal mesh reconstructions (35k faces).

*{douglas_lanman, daniel_crispell, yong_zhao, taubin}@brown.edu
†pgs@cs.brown.edu

Figure 2: Reconstruction results for the woman with fruit basket model. On the left, an image acquired with the flash located to the left of the camera. On the right, the point-based reconstruction using 67 images to estimate the Phong reflectance model.

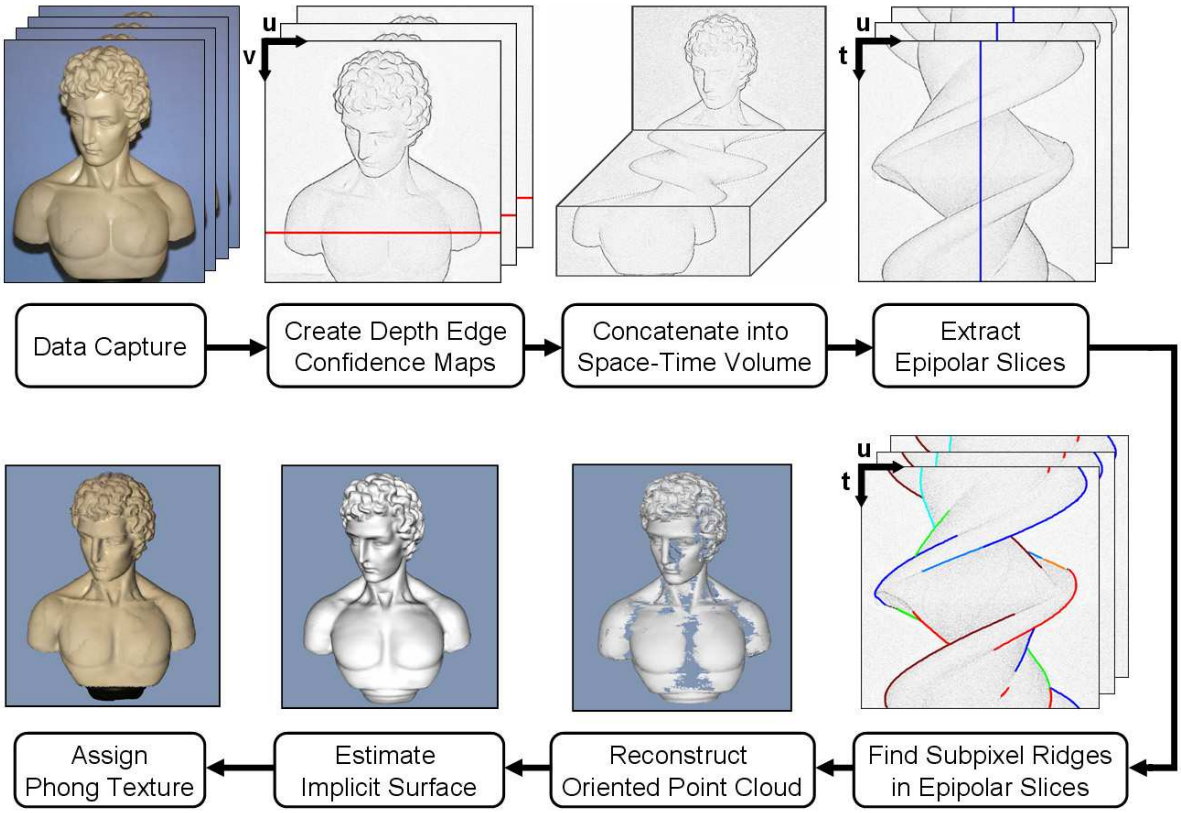


Figure 3: Overview of Multi-Flash 3D Photography. Data capture involves acquiring four images (using illumination from the top, left, bottom, and right) for each of 670 viewpoints of the object. Following data capture, a *depth edge confidence map* is estimated for each viewpoint. The confidence maps are concatenated to form a space-time volume. Each epipolar slice (corresponding to an image scanline) is processed independently. After extracting subpixel ridges in the confidence maps, differential reconstruction is applied to estimate an oriented point cloud. In order to fill sampling gaps, an implicit surface is fitted. Finally, each point is assigned a Phong texture using 67 viewpoints.

Figure 4: Reconstruction results for the hand model. From left to right: an input image, the reconstructed model viewed under similar illumination conditions, another input image, a corresponding view of the model.

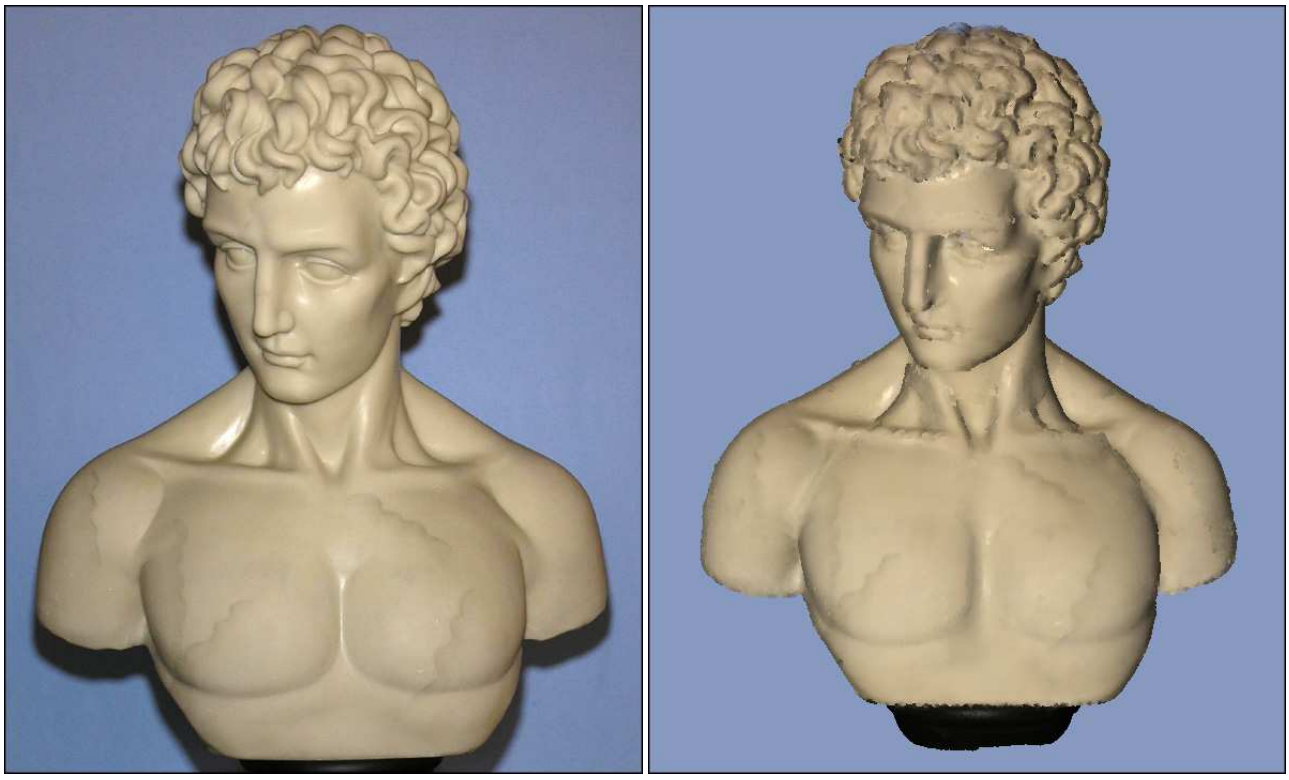

Figure 5: Reconstruction results for the bust model. On the left, an image acquired with the flash located above the camera. On the right, the point-based reconstruction using 67 images to estimate the Phong reflectance model.