Supplemental Material for:
A High-Resolution Face Scanning System Based on Polarized Spherical Gradient Illumination

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Figure 1: System illustration showing the two cameras, projector, and polarizer. Part of the sphere of lighting is visible on the right. The camera to the left is only used for stereo. The camera to the right has a rotatable polarizer placed in front of it. This camera captures the gradient illumination patterns for used for estimating normals and reflectance properties, as well as capturing structured light patterns for stereo. The projector is fitted with a long throw lens to concentrate the available light and pixel resolution on the face of the human subject.
Figure 2: Captured images under different illumination patterns. The top row shows images under (from left to right) left gradient, top gradient, front gradient, and full on illumination. These images are cross-polarized to measure only the depolarized subsurface reflection. Next row shows same illumination patterns with parallel polarization, capturing both subsurface and specular reflection. Next row shows projected structured light, with a full on white pattern on the left and three stripe patterns of varying frequency. Bottom row shows remaining stripe pattern on the left and a reference point source lit image captured strictly for validation.
Figure 3: Renderings of subjects with acquired geometries, normal maps, and reflectance properties. The combination of the high resolution camera and the relative lack of subject motion due to the short capture time allow for the capture of facial detail down to the scale of skin pores. Our capture process produces estimates of diffuse albedo and specular intensity. A single user-specified specular roughness was used.