Multi-Spectral Data Acquisition Techniques for Analyzing Surfaces

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Advancements in optical data acquisition methods have resulted in a number of practical photometric capture techniques for accurately recording the physical appearance of real objects. Today, several imaging modalities are available for documenting diffuse reflectance, surface geometry and sub-surface materials. I will present a low-cost data acquisition technique that combines 2D multi-spectral imaging with 3D normal estimation to analyze surfaces. I will demonstrate how imaging objects under electromagnetic radiation from controlled orientations and at different wavelengths produces multi-channel datasets that convey more information about 2D surface texture, underlying materials and 3D surface detail, than traditional 3D scanning methods. My analysis will show the robustness of the computed datasets for analyzing artwork and documenting biological specimens.

Biography

Dr. Toler-Franklin is a University of California President's Postdoctoral Fellow in the Computer Science Department at UC Davis. She is also a researcher at the CITRIS Banatao Institute at UC Berkeley. Dr. Toler-Franklin earned her Ph.D. in Computer Science from Princeton University. She obtained a Master of Science degree in Computer Graphics and a Bachelor of Architecture degree from Cornell University. Dr. Toler-Franklin's research area is Computer Graphics, focusing on 3D data acquisition, non-photorealistic rendering and machine learning. Dr. Toler-Franklin was awarded the 2013 NSF iDigBio Visiting Scholar Award to support her current work developing new optical capture techniques and image processing algorithms to digitize recent and fossil primates from rare collections at the American Museum of Natural History Vertebrate Paleontology and Mammalogy collections and the Duke University Lemur Center, Fossil Primates Division.