

Imaging moon caves using indirect light

Dr. Andreas Velten

*Laboratory for Optical and Computational Instrumentation (LOCI)
University of Wisconsin at Madison*

When passing through a scene light typically undergoes multiple reflections in its path from the light source to the detector. The vast majority of imaging techniques relies exclusively on light that travels a direct path from the object of interest to the detector. Indirect light often makes up a significant part of the collected image information. Our techniques aim to infer information about complex light paths by measuring the time of flight of photons emitted by an active light source.

With this rich multipath information we reconstruct images of objects outside the direct line of sight or behind scattering layers. Our methods of seeing around a corner or through scattering media have applications in many areas and across multiple size scales. We are exploring traditional diffuse tomography approaches for imaging through human tissue and fog, as well as novel approaches to image into caves on the moon from an orbital platform.