

Representing and Predicting Appearance

The neural radiance field (NeRF) has received significant attention over the past five years by easing the capture of an object's appearance in a fixed lighting environment. This novel view synthesis is however only a partial appearance representation. To make it more complete, it would need to be relightable too. A common approach to obtaining a more complete appearance representation is then to fit parameters in analytic models describing bidirectional reflectance. But these representations are limited by the assumptions used to develop the analytic models. If we instead estimate material optical properties, we get the advantages of not only relightable novel-view synthesis but also editability. In turn, if we can relate the optical properties to the material composition and the production process, we get the ability to predict the appearance of an item to be produced based on specified constituents and process parameters. This talk is on estimating material optical properties for the purpose of appearance prediction and on how to validate such estimated properties using photo-render comparison. In addition, we will consider appearance representation that includes subsurface scattering and avoids the common limitations of macroscopic analytic bidirectional reflectance functions.

Short bio

Jeppe Revall Frisvad is an associate professor with more than 15 years of experience in material appearance modeling and rendering. As a highlight, his work includes the first directional dipole model for subsurface scattering. His research interests include methods for both computation and photographic measurement of the optical properties of materials.