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### Reflectance Retrieval in Shade using Adjoint Radiosity

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#### Conference theme:

- Advanced preprocessing and processing of remotely sensed data
- Physical modeling in remote sensing
- Radiative transfer based approaches
- Remote sensing applications

#### Abstract

Current reflectance retrieval algorithms assume the target is illuminated only by sun and skylight, and neglect the effect of adjacent 3-D surfaces such as trees and buildings and the impact of non-ideal illumination conditions such as partial cloud cover. We propose to develop new approaches to retrieve the reflectance of objects hidden in shadows for urban environments and under vegetative canopies. The measured sensor radiance of an object facet can be expressed as the convolution of the bi-directional reflectance distribution function of an inclined surface with the hemispherical irradiance field, plus added atmospheric scattering. Using the measured radiance spectrum, it may be possible to retrieve a more realistic reflectance spectrum by estimating the irradiance field and the orientation of the facet. New developments in computer graphics research, adjoint radiosity method, which allows the iterative retrieval of the irradiance field using an image and knowledge of the 3-D structure. We propose to adapt this method for remote sensing purposes.