Exploring the Performance of an Inverse Monte Carlo Method in Extracting Absorption of Optical Phantoms JOHN BOWMAN, ADAM EGGERT, BRENT REICHERT, KARTHIK VISHWANATH, Miami University — The Inverse Monte Carlo (MC) Model can extract optical absorption and scattering properties by fitting a measured diffuse reflectance spectrum. In order to fit the data, the MC model requires accurate shapes of absorption spectra expected to be present in the measured sample. Since many times, we may not have knowledge of the absorption properties of a sample, the use of the inverse MC model becomes difficult. Here we test if we can experimentally ascertain accurate ranges for the optical scattering by using experimental measurements of diffuse reflectance from phantom media. Liquid optical phantoms were prepared using food dye (absorber), polystyrene spheres (scatterer), and water (background). Phantoms were prepared with scattering coefficients ranging between 0-30 cm^{-1}. Diffuse reflectance from phantoms with varying absorption and scattering will be collected using fiber optical probes and these data analyzed with the MC model. The errors in extracted optical scattering of the phantoms, with correct and incorrect absorption inputs, will be examined.

John Bowman
Miami University