Abstract Submitted
for the OSF07 Meeting of
The American Physical Society

**A calibration approach for the rapid estimation of fluorophore excited-state lifetimes with applications in biomedicine**[1] SCOTT B. KELLER, JOSHUA A. JASENSKY, HECTOR MICHAEL DE PEDRO, ERIC W. FREY, PAUL URAYAMA, Miami University — Nanosecond-pulse-width lasers, such as nitrogen lasers, are relatively inexpensive and are commonly used for biological and biomedical applications. Because the laser pulse width is comparable to fluorophore excited-state lifetimes ($\sim$1 – 10 ns), deconvolution of the temporal system response is needed for accurate lifetime determination. Such deconvolution analysis can be time consuming, and so we report a method for rapid lifetime estimation based on geometric features of the time-resolved emission signal. We find that the time-integrated signal, normalized to the peak intensity, is linear with the lifetime, and can be used for calibration of the measured emission signal to the excited-state lifetime. The approach is accurate to $\sim$15% despite using emission signals with low signal-to-noise ratios ($\sim$10). The approach has applications ranging from flow cytometry to fluorescence lifetime imaging microscopy. Results from fluorescence-based pH sensing are presented.

[1]Supported by an award from Research Corporation. SBK and EWF were supported by MU's Undergraduate Summer Scholars program. EWF was supported by MU's CAS Dean's Scholar program.

Paul Urayama
Miami University

Date submitted: 28 Sep 2007 Electronic form version 1.4