

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

Sorting Category: 10.6 (E)

**Expanding the applicability of multi-photon fluorescence recovery after photobleaching *in vivo* by incorporating convective flow into the recovery model**<sup>1</sup> KELLEY SULLIVAN, University of Rochester Department of Physics and Astronomy, WILLIAM SIPPPELL, University of Rochester Department of Biomedical Engineering, EDWARD BROWN, JR., Manhattan College Department of Physics, EDWARD BROWN, III, University of Rochester Department of Biomedical Engineering — Multi-photon fluorescence recovery after photobleaching is a well-established microscopy technique used to study diffusion, with expanding applications *in vivo*. We present a new model of fluorescence recovery that explicitly includes the effect of convective flows within a system, thereby improving the efficacy of the technique *in vivo*, where convective flows are omnipresent. We test this “flow” model through both simulations and *in vitro* experimentation, and demonstrate the effectiveness of the new model *in vivo*. Our results show that the flow model significantly improves the capabilities of multi-photon fluorescence recovery after photobleaching *in vivo*, by enabling an accurate determination of the diffusion coefficient, even when significant flows are present.

<sup>1</sup>This work was funded by a Department of Defense Era of Hope Scholar Award (W81XWH-05-1-0396) and a Pew Scholar in the Biomedical Sciences Award to Edward Brown III.

Prefer Oral Session  
 Prefer Poster Session

Kelley Sullivan  
ksullivan@pas.rochester.edu  
University of Rochester

Date submitted: 20 Nov 2008

Electronic form version 1.4