PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 10, No. 23

Multiphoton Microscopy in the Biomedical Sciences IX

Ammasi Periasamy
Peter T. C. So
Editors

25–27 January 2009
San Jose, California, United States

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Volume 7183

Proceedings of SPIE, 1605-7422, v. 7183

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Please use the following format to cite material from this book:
Author(s), "Title of Paper," in *Multiphoton Microscopy in the Biomedical Sciences IX*, edited by Ammasi Periasamy, Peter T. C. So, Proceedings of SPIE Vol. 7183 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 1605-7422
ISBN 9780819474292

Published by
SPIE
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445
SPIE.org

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

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BEST STUDENT POSTER AWARD

7183-77

STED microscopy made simple

Andreas Schönle, Lars Kastrup, Katrin Willig, Dominik Wildanger, Benjamin Harke, Brian Rankin, Christian Eggeling, Alexander Egner, Stefan W. Hell

Max-Planck-Institut für Biophysikalische Chemie, Germany

ABSTRACT

We present a simple, low-cost STED microscope setups entirely built from standard optical components and based on light sources which are available off the shelve. The devices have been optimized to allow fast alignment through a simple, robust protocol and thus stable operation even by non-expert users. In this configuration, we achieved routine resolutions of down to 70 nm, thus surpassing the diffraction limit 3-fold. This implementation of the STED-principle can therefore serve as a template for researchers seeking to apply non-invasive far-field sub-diffraction imaging or fluorescence fluctuation spectroscopy in nano-sized focal volumes to solve their scientific problems.

BEST STUDENT POSTER AWARD

7183-91

Optimization of fluorescence collection in multiphoton microscopy

Joseph Zinter, Michael J. Levene

Yale Univ., New Haven, Connecticut

ABSTRACT

Efficient fluorescence collection is critically important to maximize image quality and depth in multiphoton microscopy. Here we present an optimized, large aperture fluorescence collection system for use with the Olympus 20 × 0.95NA objective and two Hamamatsu H7422P-40 GaAsP photomultiplier tubes. Using Zemax optical design software to model the fluorescence intensity distribution and collection geometry, we have designed and constructed an optimized, large aperture detector housing assembly, which provides a significant increase in collected fluorescent signal, image quality, and maximum imaging depth.