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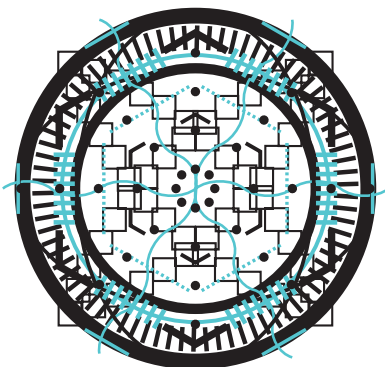


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2

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4

3

5

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Example:

"Design of a confocal fluorescence microscope"

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The screenshot shows the search results page for 'microscope AND fluorescence'. The top navigation bar is identical to the previous screenshot. The search box now contains 'microscope AND fluorescence' and the 'SEARCH' button is highlighted. Below the header are navigation links: HOME, PROCEEDINGS, JOURNALS, eBooks, TOPIC COLLECTIONS, LIBRARIANS. The main content area is titled 'Search Results for microscope AND fluorescence' and includes a 'Sign up for Search Alerts' link. A 'NARROW' filter section on the left is highlighted with a red circle '4' and contains 'Results' (All Content selected, My Content), 'Content Type' (Proceedings 2616, Journal Articles 2049, eBooks 129), 'Topics' (Luminescence 2246, Microscopes 1472, Tissues 1136, Microscopy 1118, Lasers 937, Photons 611, Scanning 550, Molecules 410, Absorption 381, Sensors 338), and 'Filters' (Open Access 592). The main results area shows 'Showing 1 - 20 of 4794' results, with a 'SORT: Best Match | Most Recently Published | Basic | Expanded' section highlighted with a red circle '3'. The first result is a 'Proceedings Article | July 05, 2007' titled 'Microscopic fluorescence lifetime and hyperspectral imaging with digital micromirror illuminator' by Artur Bednarkiewicz and Maurice P. Whelan. A red circle '5' is placed over the PDF icon. The second result is a 'Proceedings Article | May 04, 2007' titled 'Microscopic fluorescence spectral analysis of basal cell carcinomas' by Qingli He et al. The third result is a 'Proceedings Article | December 18, 2000' titled 'Laser-induced microscopic fluorescence and images of skin tissues' by Zhiwei Huang et al. The fourth result is a 'Proceedings Article | December 06, 1996' titled 'Enhanced energy transfer in respiratory-deficient endothelial cells probed by microscopic fluorescence excitation spectroscopy' by Herbert Schneckenburger et al.

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Proceedings Article

Microscopic fluorescence lifetime and hyperspectral imaging with digital micromirror illuminator

Artur Bednarkiewicz ; Maurice P. Whelan
[+] Author Affiliations

Proc. SPIE 6630, Confocal, Multiphoton, and Nonlinear Microscopic Imaging III, 66300A (July 10, 2007); doi:10.1117/12.728422

From Conference Volume 6630
Confocal, Multiphoton, and Nonlinear Microscopic Imaging III
Tony Wilson; Ammasi Periasamy
Munich, Germany | June 17, 2007

Abstract

abstract

New approach to acquisition, analysis and reconstruction of Microscopic Fluorescence Lifetime Images (FLIM) and Hyper Spectral Images (HSI) is presented. Spatial selectivity is obtained with a Digital micro-Mirror Device Illuminator (DMDI) combined with a fluorescence microscope. More specifically spatially selective illumination is achieved by tilting the relevant group of micro-mirrors to reflect the excitation light from a UV picosecond laser diode towards chosen regions on the sample. In the first step, the whole field fluorescence image is collected by a color CCD camera for further qualitative spectral analysis and sample segmentation. In the next step fluorescence of the sample is excited segment by segment and acquired with a single detector (e.g. photomultiplier in photon counting mode for FLIM, CCD spectrophotometer for HSI) from the whole field of view. The acquired fluorescence is analyzed in following step for further FLIM or HSI image reconstruction. This can be facilitated by either raster scanning over the sample or by directly accessing specific regions of interest. The unique features of the DMD illuminator allow to Globally Analyze (GA) the sample and supply on-line good initial values for fitting algorithms associated with the subsequent raster-scanning, which in turn decreases the computation time needed to obtain a satisfactory quality-of-fit. FLIM/HIS images acquired on phantoms and on biological samples demonstrate the possibilities for temporal and spectral "unmixing".

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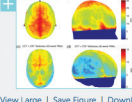
Figures

Fig. 1
F1:
Circular regions of interest (ROIs) around the chosen 10–5 locations displayed on adult head model for (a) top view and (b) lateral view. Each ROI is depicted with a different color and the 10–5 location of reference is defined in the color bar.



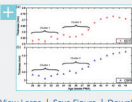
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Fig. 2
F2:
(a) and (b) show the spatial distribution of the sum of the scalp, skull, and cerebrospinal fluid (CSF) thickness (i.e., brain depth) in the adult head model, as displayed on the scalp in (a) top view and (b) lateral view. (c) and (d) show the spatial distribution of sum of the extra-cerebral tissues (ECT) and CSF thickness in a representative infant head model (40-week PMA) displayed on the baby's scalp: (c) top view and (d) lateral view.



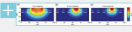
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Fig. 3
F3:
Median values of (a) the ECT and (b) the CSF thickness for each infant's age. Your infants tend to have similar values, which have been grouped into two clusters, c from 29- to 33-week PMA and cluster 2 from 34- to 38-week PMA.



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Fig. 4
F4:
Examples of photon measurement density functions at three different source–detector distances: (a) 30 mm channel, (b) 8 mm channel, and (c) 3 mm channel. The log sensitivity is displayed. Only the upper 40 mm of the multilayer slab model is displayed for visualization purposes. The white dashed lines indicate the borders of the tissue layers between scalp and skull, between skull and CSF, and between CSF and GP top to bottom.



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Pioneers In Neurophotonics: Special Section Honoring Professor Lawrence B. Cohen

All-optical mapping of barrel cortex circuits based on simultaneous voltage-sensitive dye imaging and channelrhodopsin-mediated photostimulation

Shun Qiang Lo ; Dawn X. P. Koh ; Judy C. G. Sng ; George J. Augustine

[+] Author Affiliations

Neurophoton. 2(2), 021013 (Mar 31, 2015). doi:10.1117/1.NPh.2.2.021013

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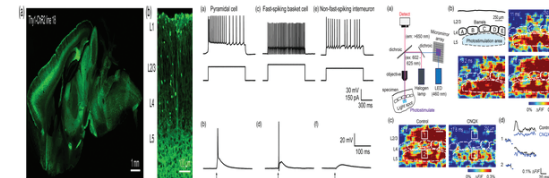
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Abstract

Abstract | Introduction | Materials and Methods | Results | Discussion | Acknowledgments | References

Abstract. We describe an experimental approach that uses light to both control and detect neuronal activity in mouse barrel cortex slices: blue light patterned by a digital micromirror array system allowed us to photostimulate specific layers and columns, while a red-shifted voltage-sensitive dye was used to map out large-scale circuit activity. We demonstrate that such all-optical mapping can interrogate various circuits in somatosensory cortex by sequentially activating different layers and columns. Further, mapping in slices from whisker-deprived mice demonstrated that chronic sensory deprivation did not significantly alter feedforward inhibition driven by layer 5 pyramidal neurons. Further development of voltage-sensitive optical probes should allow this all-optical mapping approach to become an important and high-throughput tool for mapping circuit interactions in the brain.



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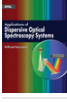

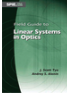
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