

Publication

Acquisition speed comparison of microscope software programs

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 755104

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Year 2011

Title Acquisition speed comparison of microscope software programs

Journal Microscopy Research and Technique

Volume 74

Number 6

Pages / Article-Number 539-45

Reliable software is a prerequisite for successful operation of a modern wide field fluorescence microscope. When used for live cell imaging, acquisition speed is of particular interest. This is both because biological processes can be highly-dynamic, and to avoid unnecessary photobleaching and phototoxicity of living samples. This article shows that besides the hardware (microscope) components themselves, the acquisition control software is an important influencing factor of speed performance. We tested and compared the speed performance of five different generic applications (Image-Pro Plus, MetaMorph, Micro-Manager, SlideBook, and Volocity) using typical experimental setups involving a single specific state-of-the-art fluorescence microscope configuration. The test measurements included multichannel experiments, z-stacking, burst acquisition, as well as combinations of these measurements with time-lapse acquisitions. The measured data provided values for guiding the testing and analysis of other microscope systems with similar configurations. Despite the identical hardware settings, significant and surprisingly large speed differences were evident among the various software applications. Additionally, no application was identifiable as the fastest in all tests. Our work pinpoints the importance of the control software in determining a system's "real" maximal imaging speed. The study could serve as basis for further tests, eventually influencing the system selection criteria for speed-sensitive applications. Microsc. Res. Tech., 2010. (c) 2010 Wiley-Liss, Inc.

Publisher Wiley

ISSN/ISBN 0741-0581 ; 1097-0029

edoc-URL <http://edoc.unibas.ch/45821/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1002/jemt.20944

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/21604324>

ISI-Number WOS:000291539200010

Document type (ISI) Journal Article