

Meta-max: an easy-to-use calibration tool to maximize the value of fluorescence microscopy data

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Fluorescence microscopy has become a more and more sensitive and versatile tool for many branches of science, thanks to many advances in fluorescent labelling as well as microscope technology and image analysis. As we continue to push the limits of what is technically possible, the quality of data obtained through fluorescence microscopy is increasingly determined by factors that are often not readily visible in the image: the image acquisition settings, microscope properties and data-processing steps often contribute significantly to the experimental outcome and therefore need to be known and understood for proper interpretation and comparison.

Accurate metadata collection and optical calibration of the microscope go a long way towards allowing imaging data to be properly evaluated and compared; however, there are certain crucial pieces of information that simply are not captured in even the most rigorous and precise routines for record-keeping and calibration, as they simply cannot be measured without the aid of (often costly, cumbersome and complicated) external devices. Here, we present an inexpensive, easy-to-use calibration device that, among other things, allows the user to measure excitation power and perform basic detector calibration routines. In doing so, the “MetaMax” tool provides crucial meta-data to evaluate potential photo-toxicity and allows current and future model-based data processing tools to get as much quantitative information as possible out of the images.