Title: A New Prototype for Real-time, time-resolved nanosecond fluorescence lifetime measurements.

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Keywords: fluorescence, LED, PMT, PMT gating, metabolites

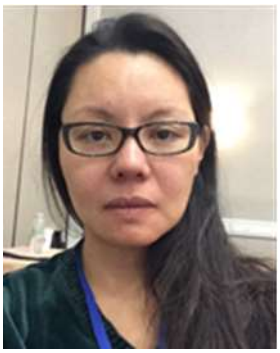
I. Abstract Body (up to 250 words)

While fluorescence technologies have been used to measure lifetime-based signals for many years, real-time measurements can track the production of reactive species and other intermediate/short-lived states in chemical reactions. Current techniques employ laser excitation, but LEDs can also be used which cause considerably less damage, especially to live cells. We have developed a new high speed fluorescence prototype instrument using high intensity LED pulses and novel PMT gating technology. A set of adaptive pulse width signals generated by a precision timing circuitry are driven through the LED using a comparator-based push-pull architecture. This new timing circuitry also generates PMT gating pulses which are applied to the dynode chain via high voltage operational amplifiers. LED pulses with fall times (99%) as short as 2ns and PMT gating times (10% to 90%) of 3.6ns have been achieved. The prototype has been used to measure the fluorescent lifetimes of dyes with/without binding to biological molecules and intrinsic metabolites in live bacterial cells.

II. Biography:

Dr. Linda S. Powers is the Thomas R. Brown Chair in Bioengineering, Professor of Electrical and Computer Engineering and Professor of Biomedical Engineering at the University of Arizona. Before joining the University of Arizona faculty, she was a member of the technical staff of AT&T Bell Laboratories [1976-1988], an Adjunct Professor of Biochemistry and Biophysics at the University of Pennsylvania [1978-1998], and Professor of Electrical and Computer Engineering at Utah State University [1998-2006]. She is a fellow of the American Physical Society and the American Institute of Chemists and her honors include the First US Bioenergetics Award of the Biophysical Society. Professor Powers earned her B.S. in physics and also in chemistry at Virginia Polytechnic Institute and State University and her M.A. in physics and Ph.D. in biophysics at Harvard University. Her current research efforts involve the detection and identification of microbial (bacteria, viruses, fungi, toxins) contamination with applications to foods/water/air quality, sterilization/decontamination, medical diagnostics, homeland security, and the search for life in extreme environments as surrogates for the moon, Mars, and Europa.

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