

Imaging Technology Update

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Stanford Photonics, Inc. Demonstrates Real Time Bioluminescence Imaging at Experimental Biology 2005

*New ONYX™ System Introduced for Optimized Low Photon Flux Visualization in Life Science Applications**

The Stanford Photonics launch of the XR/MEGA-10Z™ in early 2004 opened up new discovery opportunities by virtue of its ability to image single photons at high speeds with virtually no detector background signal. With **fewer than 10⁻⁴ dark counts per pixel per second**, it takes almost two hours to generate an average background count equivalent to one photon per pixel. High front end gain allows for readout of 2-D mega pixel images of single photon distributions in real time without the readout latency/read noise artifacts intrinsic to slow scan/slow clock CCD's. And this performance is accomplished with -20°C cooling--**no liquid nitrogen** or exotic mechanical vacuum seals.

"In order to fully leverage this technology, we found it necessary to build a box that was truly light tight and non-emitting," states Mike Buchin, President. "The ONYX is the result of that effort. We continue to add features and options to this product,

including **proprietary software for photon accumulation imaging**, in order to create an open platform for development and exploration for the research scientist."



ONYX™ Imaging System

Stanford Photonics, Inc. Promotes Proprietary Software for Use with All XR™ Series High Speed ICCD Cameras

Stanford Photonics has consistently pushed the envelope in providing researchers with products that can image down to single photon thresholds at speeds unmatched by other camera platforms.

"Unfortunately, many commercial image acquisition packages are still bogged down by time bases and sample windows measured in seconds as opposed to milliseconds," states Michael Buchin, President. "Last year, we initiated a program to develop software that would allow customers to fully leverage the capability of our products. We featured this new system at the recent Biophysical Society Meeting."

"We don't have a clever name for this software yet, but it is data friendly,

painlessly letting you "**Stream it, See it and Save it™.**"

The software provides low cost RAM or RAID array recording with flexible user options for processing and displaying incoming data in a **parallel viewing window**. This pipeline allows "**time bandwidth rubberbanding**" while recording--you can play with averaging, stacking and false colors to see what's going on, while seamlessly saving full bandwidth TIF files to memory. The **automatic TIF conversion** allows easy, immediate export capability to virtually any post processing analysis program.

Stop in and take a look--we know you will like what you can now easily see.

ONYX™

Real Time Luciferase Imaging*
XR/MEGA-10Z™ Enabled
Complete System Solution



Transgenic mouse (licensed* facility)
Imaging time: 1-10 seconds, typical

- Sample chamber: light tight/ non-emitting
- Peltier cooled: no liquid nitrogen
- Exposure times from milliseconds to hours
- Virtually no dark count or read noise artifacts

▶ Visit us in **Booth #1530** and see our latest technologies for photon limited detection

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New ONYX™ System Introduced for Optimized Low Photon Flux Visualization1

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XR/Turbo™: Calcium Signaling Application; New Higher Resolution in 1000 FPS Mode.....2

THE NEED FOR SPEED IN CALCIUM SIGNALING: “Intracellular Calcium Waves Accompany Neutrophil Polarization, Formylmethionylleucylphenylalanine Stimulation, and Phagocytosis: A High Speed Microscopy Study” by A. L. Kindzelskii and H.R. Petty, Wayne State University

“...A long title, but definitely in line with our efforts to develop technology for transient/dynamic event capture,” says Mike Buchin.

Even at 1000 fps, the XR/Turbo™ ICCD camera operates down to the single photon limit. And with the standard gating power supply and optional external trigger input, the XR/Turbo™ facilitates **strobe-synchronous imaging**, the method used to isolate calcium waves by the researchers at Wayne State University (GEN II PentaMax, Roper Scientific). Coupled with Stanford Photonics proprietary software for **full bandwidth, unlimited run length, and**

TIF formatted streaming to RAID, the XR/Turbo™ is well suited for this type of application.

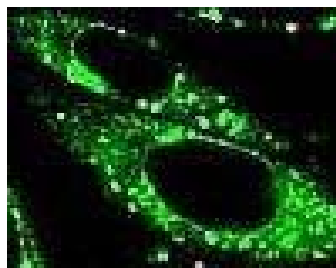
The XR/Turbo™ is available with all intensifier tube options, including the **cooled photocathode GaAsP** for zero dark count, single photon detection. In response to requests for higher resolution, we recently added a new 1000 fps mode which provides a 320 by 80 ROI with 2 X 2 binning (33% picture height vs. full image via 6 X 6 binning). This generates an effective pixel size of 40 microns, or 20 microns with optional 1:1 fiber optic coupling.



*XR/Turbo™ ICCD camera:
Strobe-synchronous imaging at 1000 fps*

And Don't Forget...

Stanford Photonics, Inc. also specializes in developing high performance customized solutions for difficult imaging requirements. A good example of this can be seen at the Solamere Technology Group booth: **a single board, dual camera capture system** that displays and streams two 12 bit mega pixel ICCD's direct to disk at an amazing 30 fps.



Cholesterol vacuole: 100 X 80 pixels

*Use of this product to practice in vivo imaging in animals (the detection of light emitted from within animals) does not imply or convey a license to practice in vivo imaging in animals as covered by patents controlled by Xenogen Corporation, the owner or exclusive licensee there under, and including the following: U.S. patent numbers 6,217,847 and 5,650,135 and European patent number 0861093. A license from Xenogen Corp. is required to practice under these patents. No right to use this product under those patents is hereby conveyed by Xenogen Corp. to the purchaser or user of this product, and the purchase or transfer of this product is not intended, either expressly or by implication, to grant any right or license to practice under any such patents. Stanford Photonics, Inc. disclaims any and all responsibility for, or liability with regards to accuracy, content, completeness, legality, reliability, operability or availability of information obtained from Xenogen Corporation.

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Stanford Photonics, Inc. Booth #1530

*Live demonstrations: Strobed XR/Turbo™ and ONYX™
Software; Customized solutions and special systems*

Solamere Technology Group Booths #1521 & 1523

*Live demonstrations: XR/MEGA-10Z™, XR/MEGA-10EX™,
Dual camera capture with 12 bit ICCD; XR/Turbo™
Yokogawa Nipkow disk confocal, lasers, AOTF*