

# Product Focus: Hottest New Technologies

## Spotlight!

2012's latest technologies

An impressive array of new technologies to support advancements in many different fields of research have emerged during 2012. This feature takes a look back at some of these hot new technologies.

**Affymetrix** provides high-quality solutions to advance science in basic and translational research. One major hurdle in advancing expression-based biomarker signatures has been the ability to generate high-quality data from RNA isolated from highly valuable formalin-fixed paraffin-embedded (FFPE) tissue sources. Affymetrix has launched the **Sensation Plus™ FFPE Reagent Kit**, which is capable of generating robust gene expression signatures from old (10+ year-old) FFPE samples starting with as little as 20 ng input RNA. The Company has also introduced **Axiom® miRNA Target Site Genotyping Arrays**, the only high-density genotyping tools for genome-wide evaluation of microRNA (miRNA) target sites.

Transcriptome sequencing, or RNA-Seq, allows a global, unbiased view of gene expression changes, including novel transcripts, isoforms, and post-transcriptional modifications. Compared to gene expression microarrays, the approach can provide a wider dynamic range for detecting rare transcripts. "One barrier to adoption, however, is the perceived difficulty in comparing prior microarray data with RNA-Seq results. That isn't necessarily the case," says Wendell Jones, Ph.D., Vice President of Statistics and Bioinformatics at **Expression Analysis**. Jones' team at Expression Analysis developed the first method for translating output from the Company's **RNA-Seq services** into the existing **Affymetrix CEL** and other microarray file formats.

High-content peptide microarrays with custom and off-the-shelf contents for immunological research are provided by **PEPPERPRINT**. The **PEPPERCHIP® Peptide Microarrays** are synthesised with a patented laserprinter-based method directly on the chip. The benefits of this approach are a unique flexibility in terms of custom peptide content, a high spot density and reduced material consumption. Microarrays are provided on conventional object slides (containing 9,000 individual peptides) and

other glass slide formats with up to 275,000 peptide spots. Assays can be performed by fluorescently labelled proteins or sandwich immunoassays.

**Life Technologies** has launched three next generation **GeneArt® Genetic Engineering Kits** that allow molecular and synthetic biologists unprecedented speed, flexibility, precision, and efficiency for the seamless cloning, assembly, and editing of genetic material. The **GeneArt® Seamless PLUS Cloning and Assembly Kit** allows investigators to complete complex assembly projects in days, rather than weeks with typically available methods. The **GeneArt® Seamless Cloning and Assembly Enzyme Mix** is the economical choice for creating constructs up to 13kb with the option for high-throughput assembly. The **GeneArt® Site-Directed Mutagenesis PLUS System** can be employed to introduce deletions, insertions and substitutions ranging from small to large fragment sizes and can facilitate single or multi-site mutagenesis.

Stem cell research, toxicology studies, and flow cytometry all rely on an accurate and consistent number of input cells **Bio-Rad Laboratories, Inc.** has launched its **TC20™ automated cell counter**, the next generation of the Company's TC10™ automated cell counter that provides accurate and reliable counts of live mammalian cells in 30 seconds. The TC20 system's improved lens and cell counting algorithm make it compatible with a broader range of cell sizes and types. This includes cells smaller than 10 microns and complex samples such as stem cells and primary cells derived from tissue or blood.

Ideal for pharmaceutical and clinical research laboratories, **Agilent Technologies Inc.** has introduced the **Agilent Automated Card Extraction LC/MS system**, a fully integrated instrument for the analysis of dried blood spots and other dried media. This system provides an automated workflow solution to improve productivity and streamline sample processing. Dried blood-spot analysis can be used to obtain detailed quantitative data about the compounds in animals and human



Promega's new luciferase, NanoLuc™

subjects, using small volumes of blood (typically 10 to 20  $\mu$ l). The stability of blood spots is often superior to frozen plasma or serum samples

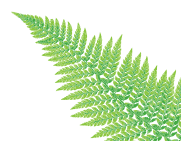
The first commercially available kit to simultaneously interrogate the relationship between nucleosome occupancy, transcription factor binding and DNA methylation within the same DNA molecule is available from **Active Motif**. Traditional methods have only been able to look individually at DNA methylation or nucleosome positioning, without the ability to understand the relationship between the two. The **NOME-Seq** (Nucleosome Occupancy and Methylome Sequencing) **assay** utilises fixed chromatin, which preserves nucleosome and protein binding locations. NOME-Seq provides researchers with a tool to better understand nucleosome occupied or depleted chromatin in the context of methylation for its effects on gene regulation.

**Promega** has introduced a new luciferase, **NanoLuc™**, a smaller, brighter, and more versatile bioluminescent enzyme, enabling more advanced reporter assays with potential in biologically complex applications that require greater sensitivity. Developed with a novel substrate, furimazine, its unparalleled small size (a 19kDa monomer) allows for enhanced viral delivery and protein fusion applications, easy

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TC20™ automated cell counter from Bio-Rad Laboratories

secretion from cells, and uses where the gene or protein size is limiting. The enzyme is two orders of magnitude brighter than either firefly (*Photinus pyralis*) or *Renilla reniformis* luciferases, resulting in improved performance in hard to transfect cells.

**Olympus** has released the new **FV10MP-BXD-GAP photodetector** for enhanced sensitivity when performing multi-photon fluorescence imaging. The new non-descanned detector unit is ideal for capturing very faint fluorescence signals and for minimising the laser power required to generate a detectable signal, making it the best choice for advanced life science research. Exceptional sensitivity is achieved by coating the photoelectric surface of the detector with Gallium Arsenide Phosphide (GaAsP), which offers superior quantum efficiency compared to conventional photomultiplier tubes.

**NanoZoomer-XR**, the newest addition to the NanoZoomer product line for whole-slide scanning has been released by **Hamamatsu Photonics K.K.** The new NanoZoomer-XR minimises workload and slide scanning time by automatically and continuously scanning up to 320 slides over two times faster than the NanoZoomer HT and RS scanners. It converts a 15 mm x 15 mm area on a glass slide into a 1.1-gigapixel colour image in as little as 30 seconds. The scanned slides are viewed smoothly and quickly



The FV10MP-BXD-GAP photodetector from Olympus.

through the newly developed viewer software (NDP.view2), and easily analysed using the IHC analysis software (NDP.analyze).

**NanoTemper Technologies** has launched the **Monolith NT.LabelFree**, the first truly label-free and immobilisation-free instrument capable of measuring biomolecular interactions using Microscale Thermophoresis (MST). This technology measures the directed motion of molecules through a local temperature gradient detecting a dynamic range of 10nM to mM dissociation constants, while only consuming <4µl of sample. The NT.LabelFree can monitor the binding of single ions (40Da) or small molecules (300Da) to a target as well as the binding of ribosomes (2.5MDa). The NT.LabelFree is easy to handle and can generate data in 10 minutes for medium through-put purposes.

**BMG LABTECH's** innovative technology greatly enhances microplate applications and can improve scientific research. For example, the **SoPRano™ label-free technology** in a simple spectrometer-based absorbance reader will obtain protein-protein binding kinetics such as the association ( $k_a$ ) and dissociation ( $k_d$ ) rates, as well as EC<sub>50</sub> and  $K_D$  values. With SoPRano™ assays and BMG LABTECH's ultra-fast, full spectrum analysis using a CCD-spectrometer, label-free applications are now

possible without purchasing expensive, dedicated SPR equipment. In addition, cell-based assays greatly benefit from the Company's innovative Direct Optic Bottom Reading design, which when used on the **PHERASTAR FS** microplate reader achieves signal-to-blank ratios for specific fluorescent cell-based assays that are more than 300% higher than other microplate readers

Expanding on its innovative benchtop CoolBox technology, **BioCision LLC**, a leader in advanced temperature management of biomedical samples, has launched the **CoolBox™ XT workstations**. "Our new CoolBox XT technology addresses laboratory demands for extended cooling technology that provides the temperature of ice, without the intrinsic problems that come with its use," said Rolf Ehrhardt, CEO, BioCision. "The CoolBox XT workstation outperforms currently available systems based on its extended cooling and freezing times, independence from power, and unique size options."

**Molecular Devices** has released **version 2.5 of its MetaMorph® NX Microscopy Automation and Image Analysis Software**, which now includes modules for the study of neuronal morphology and fiber structures, support for targeted illumination devices, and a high-speed image acquisition mode. The Neurite Tracing Application Module simplifies the challenging, meticulous tasks associated with neuron research, while the Fiber Tracing Application Module quickly makes sense of complex, interwoven fiber structures.

A powerful simulation toolkit for neuroscientific experimentation has been released by **Intific, Inc.** The **Real World® with NeuroBridge™ software platform** allows researchers to easily develop and explore complex immersive experiences in order to understand human cognition. It is a leap ahead in neuroscience software, providing engaging experiences as well as a mechanism to feed back real-time brain activity to the simulation experience. The NeuroBridge™ software enables correlation of simulation events with dynamic brain activity (EEG) and other physiological signals.

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## Companies mentioned in this Product Focus

Active Motif

Affymetrix

Agilent Technologies

Bio-Rad Laboratories

BioCision

BMG LABTECH

Expression Analysis

Hamamatsu Photonics

Intific

Life Technologies

Molecular Devices

NanoTemper Technologies

Olympus

PEPPERPRINT

Promega

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