Center for Toxicology, Southwest Environmental Health Sciences Center (an NIEHS Center, ES06694)

Cellular Imaging Core Newsletter

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Upcoming High-speed Confocal microscope demos

Dr. David Elliott (626-7870, Elliott@arizona.edu), of Cell Biology & Anatomy, is spearheading an effort to submit a shared instrumentation grant (March 2008) for a spinning disk confocal microscope. While the current confocal microscopes are very powerful and versatile, they cannot acquire images rapidly enough to capture fast biological processes. A spinning disk confocal uses a different optical technique, and can acquire images as fast as hundreds of frames per second, making it ideal for live cell imaging of fast moving cellular events. If your research could benefit from high-speed fluorescence imaging, please contact Dr. Elliott for more details.

In the next few weeks the following instruments are scheduled to be demonstrated on-site. Contact Dr. Elliott for more details and for vendor contact information. We encourage you to schedule an appointment to see these instruments.

- **Andor** will be bringing a spinning disk system on February 19-20 in the MRB
- **Leica Microsystems** will be demonstrating their spinning disk confocal March 11-12 in the MRB.

How do spinning disk confocal microscopes differ from what we already have?

The confocal microscopes on this campus are "point scanning" devices. A single laser spot is moved across the specimen in a raster pattern and the fluorescence at each point is measured using a photomultiplier tube. A confocal pinhole is used to reject the out-of-focus fluorescence light that comes from the specimen, leaving an image that has improved resolution and greatly improved contrast. Point scanning instruments provide adjustable pinholes so that any available objective lens on the microscope may be optimally used for imaging.

Spinning disk instruments scan an array of tiny pinholes, creating hundreds of points of light, across the sample at high speed. When the fluorescence passes through these spinning pinholes, the image is captured by a highly sensitive camera (typically an EM-CCD). The ability to capture image information from hundreds of locations simultaneously is what allows a spinning disk confocal to acquire images at very high speeds. The disadvantage to spinning disk confocal microscopes is that the pinholes are usually of a fixed size that is optimized for a specific lens (typically a 63X objective). Experiments performed using other objective lenses are somewhat compromised by the inflexibility of the pinhole size.

A helping hand for your research

A student getting ready to leave for a post-doctoral fellowship said to us the other day "I wish I had taken advantage of the core facilities sooner in my graduate program. Things just go so much smoother and quicker when you use the cores." To which we can only say "Thank you" and "you are most welcome".

Is there a way that the Cellular Imaging Core can help you or the members of your lab? From the simple to the complex, our job is to assist you with anything related to microscopy and imaging. We can assist in experimental design, sample preparation, interacting with core facility staff, instrument operation, image analysis (measurements) and interpretation, figure layout, and write-ups for articles and/or grant applications.

It's a new "Day"

In the October newsletter we mentioned that the long-time manager of the AHSC electron microscopy facility, Peggy McCuskey, was retiring. If you haven't been by the EM facility recently (Life Sciences North 410), please stop by and introduce yourself to Dr. Tony Day. Tony is the new manager of the facility and he comes with several decades of EM experience.

Be sure to stop by and thank Peggy for her 30+ years of service at the UA. She will be gone by the end of February.

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