

add a second signal processor. Violá! Stereovision. With an appropriately chosen objective lenses, positioned correctly, we now have a 10X digital stereo Mousescope™. 20X and so on are equally doable.

Not being satisfied with this, we are currently working on replacing the single objective with a two element design, with a movable second lens in front of the first lens, acting to zoom the magnification.

Now we can not only zap the bad guys, but take rapid digital micrographs of reasonable quality of any surface on which we place the mouse. Very useful for following live cells, surface reactions and microcorrosion, on-chip micromachines, and just what those bloody dust mites in our pillows are up to anyway.

There is still some fiddling with software, perhaps Photoshop, to integrate the images from the two cameras and processors. These would then be shown on the computer monitor to produce stereo imaging. We admit that this isn't going as well as hoped. Color anaglyph images interfere with the hoped-for color imaging, and polarized images with polarized viewers don't cooperate well with LCD monitors.

But as soon as we link this issue to bioterrorism, we'll be able to get a multi-million dollar DARPA grant, hire a battery of programmers and monitor engineers, and solve the problem in no time. What's a few million dollars for software and monitor design, when with a few simple modifications of the ubiquitous computer mouse we have invented a cordless, go-anywhere \$30 digital stereomicroscope? ☺

Lee van Hook

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A Quick Method for Safely Restraining Mouse Pups for Microscopy

I visualize green-fluorescent protein labeled mouse pups with a Leica stereoscope setup (not using confocal). On the stereoscope I often look at newborn pups or pups that are a few days old. I have used a piece of plastic wrap to hold them still (not too tight) and it holds the skin taut which helps. To do this without harm to the pups, I have been taping one edge of the plastic down and then holding the other side with my free hand. Light tension is all that is needed, and it never seemed to bother even one day old pups. By using tension the actual pressure is quite light. The pups seem to naturally stop wiggling with this pressure (like having mom sit on you in the nest?) and the light from the scope. To keep the pups warm we got a 37 degree heated mat from Harvard which warms the whole stage when placed underneath.

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A Simple Image Archive That's Cheap, Too!

Our group has many archived Kodachromes, EM micrographs and digital images, and continuously produces new images in all formats. Primarily, these are light micrographs of hematoxylin & eosin stained tissue sections and immunohistochemistry slides, but they also include electron micrographs and confocal micrographs. It has been a continuous problem to keep track of all these images, since

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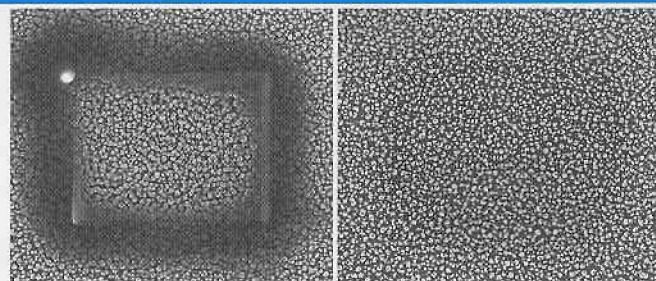
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A silicon "grass" sample irradiated for 10 minutes before (left) and after (right) the use of Evactron SEM-CLEAN device. 50kX - From *Active Monitoring and Control of Electron Beam Induced Contamination* by Andras E. Vladar, Michael T. Postek and Ronald Vane* "Active Monitoring and Control of Electron Beam Induced Contamination" Proc. SPIE Vol. 4344 (2001), 835

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MICROSCOPY 101

every researcher tends to keep their own binders and electronic files, making it difficult to know exactly what we have available. We have a central lab database built with Microsoft Access, which is accessible by everyone in the group from their desktop computers. Our goal was to have an image archiving system that would allow anyone in the group to see what we have in our extensive files using the database to search by any criteria. We had built a system in our database that satisfied most of what we wanted as far as cataloging and searching. The big problems were: 1) entering the data, especially for archived images, 2) producing thumbnails for view in the database (very time consuming), and 3) scanning and archiving the images at publishable quality on the servers. This last requirement was especially onerous since the LAN people do not want the servers filled up with images.

We found a solution in two products. First, we acquired a PowerFile CD/DVD changer that accommodates 200 disks and has two drives (\$1,800, www.dvdchanger.com). This gives us "near-line" storage for images that are not used very often, but that are available when wanted and within a reasonable time (20 to 30 seconds). The Powerfile is connected to a local machine via Firewire and then shared over the network. A server version is also available. With 200 DVD disks, the PowerFile can hold up to 900 GB of data. Ten PowerFiles can be daisy chained if more storage is required.

Secondly, we use Thumbs Plus (\$350/5 users, www.cerious.com) as the cataloging software. Thumbs Plus will automatically catalog any file or drive, either local or network, and produce thumbnails. Within Thumbs Plus we can add user-defined fields to hold our unique identifiers for each image. ThumbsPlus uses the MS-Access JET database engine that makes it a very simple matter to link to any other Access database. Additionally, it will connect by ODBC protocols to many other database programs. These features made it ideal for our purposes. Presently Thumbs Plus is designed to be the "parent" database. Cerious Software is working on allowing it to be the data source, however. The way we use it is to put a button on an Access form and open it from Access to search for images. With the links from Thumbs Plus back to our Access database we can use any field to perform searches.

Within our database we can now log images as we take them. The images are then burned on CD's or DVD's and put in the PowerFile. We then use ThumbsPlus to catalog those images and produce thumbnails. We add a unique identifier that links back to our main Access database, thereby linking to all information from a given case. With this setup anyone can now access any image that has been put into the PowerFile without leaving their work area.

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What can you imagine?

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