THE PROBLEM: As a microscopist you often have to work with samples that are difficult to focus. When viewing a 3-D sample using an optical microscope you frequently cannot see your entire sample in focus at any one time, due to depth of field limitations. Your only option is to view a series of partially focused images. If it is critical to see your whole sample in focus, then you may have to manipulate several images with computer software, or worse still draw it by hand, to produce the picture you really want.
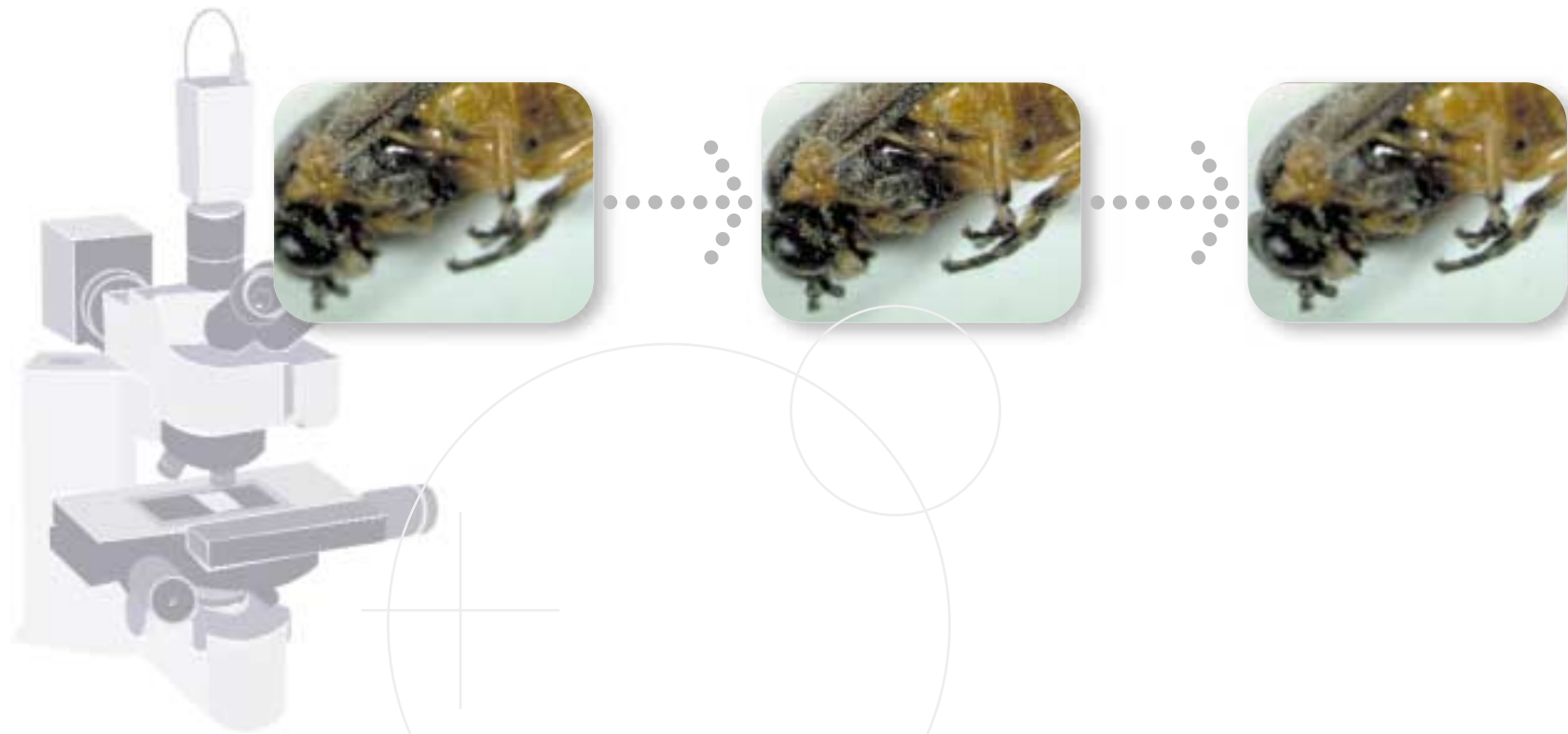
The Auto-Montage range detailed in this brochure is flexible, and includes both basic and advanced software, right through to a fully automated capture system. Whatever your application or budget, Syncroscopy has the right solution for you.

Auto-Montage Pro   **Auto-Montage Essentials**   **Auto-Montage Pro System**

Auto-Montage

> FOR PERFECTLY
  FOCUSED IMAGES
  OF 3-D SAMPLES

THE SOLUTION: Auto-Montage - a software so powerful that it can combine the in-focus sections of your source images to produce one perfectly focused montage image in seconds. In addition you get the benefit of having a wide range of image manipulation functions at your fingertips to further enhance your work.

Auto-Montage Pro

Do you:

- Want to quickly produce in-focus images of 3-D samples?
- Work with a range of different sample types?
- Need to make detailed measurements?
- Require different views of the focused image?
- Produce reports using images of 3-D samples?
- Already have an optical microscope and digital camera?

Say **yes** to any of these questions
and Auto-Montage Pro software
is perfect for you.

Simple User Interface

Auto-Montage Pro features a main window with two workspaces, making the software simple to use. With viewing options presented as icons on one side of the screen and the final image on the other, you'll find it easy to track the changes you've made to the image. The workspaces use a flow chart to show you the relationship between each image generated, as well as allowing you to quickly select which Montage or Viewing methods gives you the result you need.
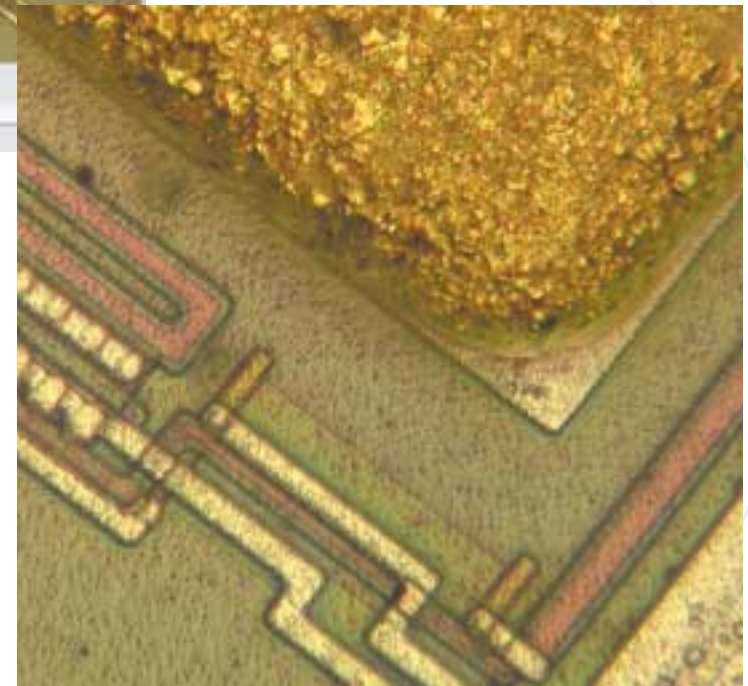
Producing a Focused Image

One major advantage of using Auto-Montage Pro is that it can be configured to fully automate the image acquisition process, by capturing a set of source images directly from the camera. Direct acquisition into Auto-Montage Pro is available with a range of camera options.

Additionally, if you are using a calibrated Z stepper, you can set up Auto-Montage Pro to automatically calculate and capture the optimum number of source images from your sample. This unique feature of Auto-Montage Pro takes the guesswork out of the capture process, by acquiring a number of images determined by the software, thus ensuring you'll produce a perfectly focused image every time - no matter how deep your sample is.

Using the Scan Montage function, Auto-Montage Pro analyses the in-focus areas in each source image, and then combines them to produce a fully focused montage image. The source images used can be viewed as a 'film strip', positioned under the final focused image, in order that you can ensure you are using the best source images of your sample.

Source Images Result Images Measurements Line Profile
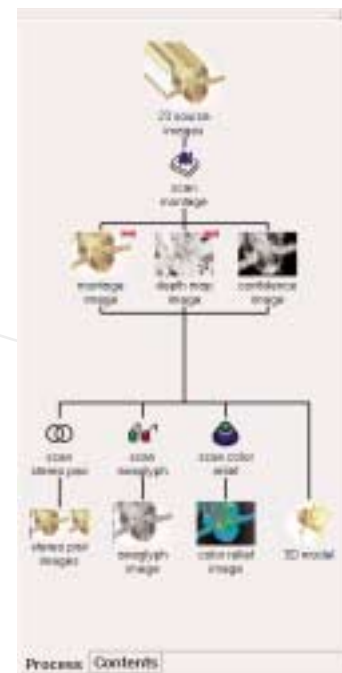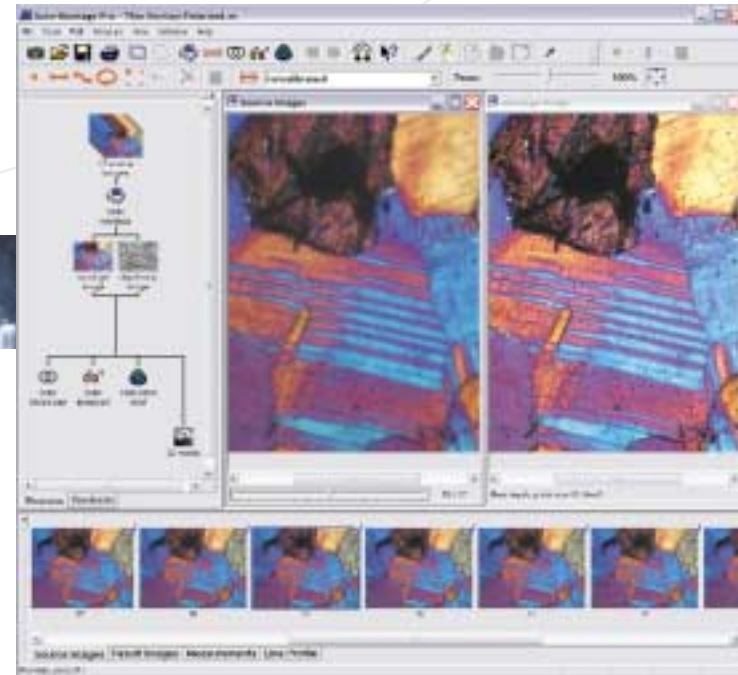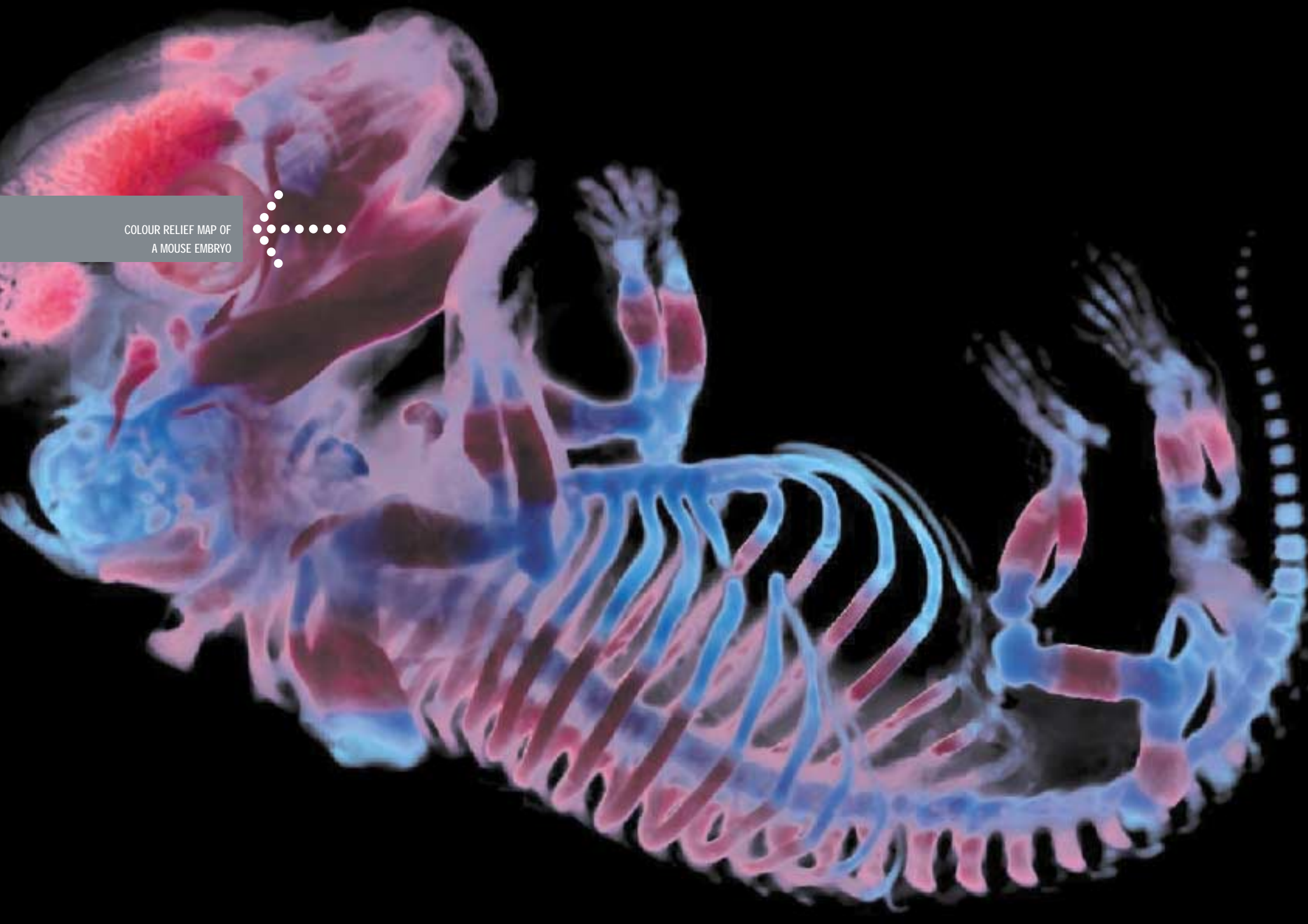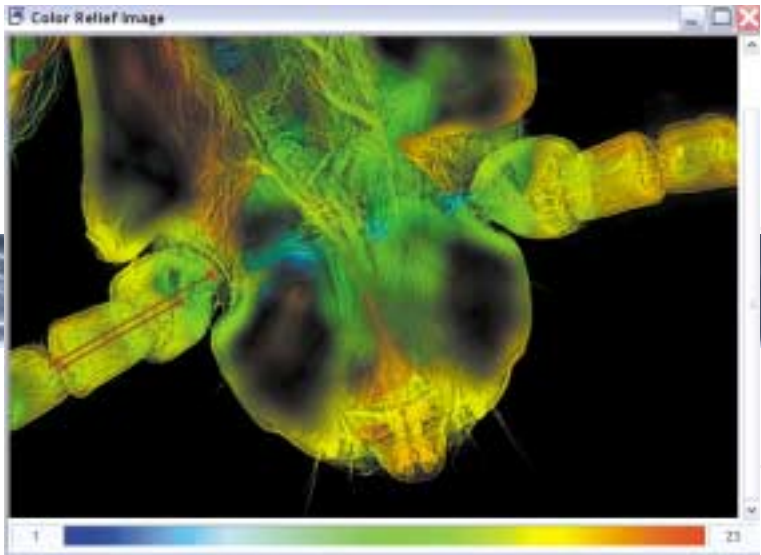
Auto-Montage Pro software offers you a wide range of algorithms (known as Montage Methods) for calculating the way in which your focused image is produced.

These algorithms are unique to Syncroscopy, and ensure that whatever your application, one of these Montage Methods will guarantee you the most accurate fully focused image of your sample. Additionally, Auto-Montage Pro has a time saving preview function that allows you to see which of the software's algorithms is most suitable for your sample before processing. No other depth of field imaging software offers this level of flexibility.
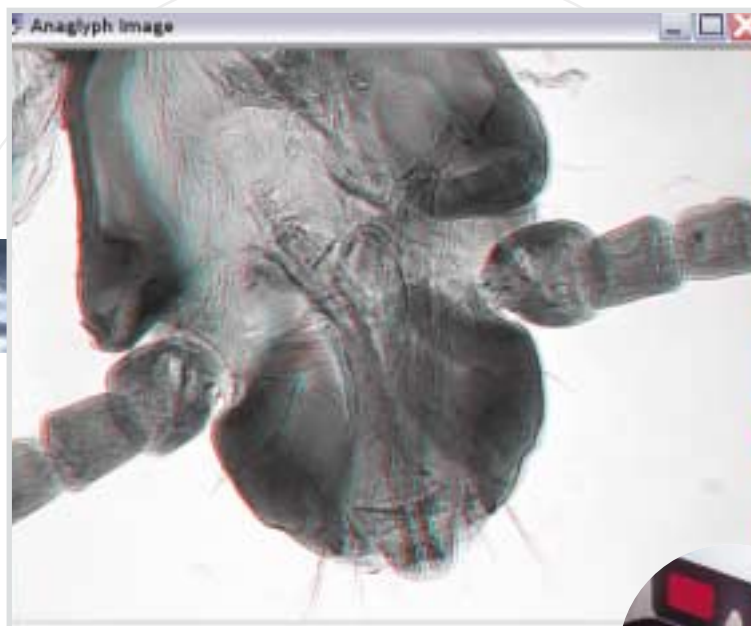
Viewing your Image
Auto-Montage Pro offers several ways of viewing the montage image and other useful height coded data.

Depth Map
As part of the Scan Montage operation, Auto-Montage Pro automatically generates a powerful Depth Map image. This is a record of which source image provided the in-focus region for the fully focused montage image at each pixel location.

Colour Relief Map
Similar to a Depth Map, the Colour Relief Map shows in pseudo colour where each source image is positioned in the image stack. The Colour Relief Map, generated by the Scan Colour Relief function of Auto-Montage Pro provides useful colour coded depth information of a 3-D sample.

Enhancing your Image

Scan Align

If you are working with a stereo microscope, the Scan Align function compensates for the changes in position that inherently occur when capturing source images. Thus, parallax error is automatically corrected to improve the alignment of your final image.

Also if your source images have been derived photographically with a macro lens and subsequently scanned in, then the Scan Align function will correct any errors in registration between frames.
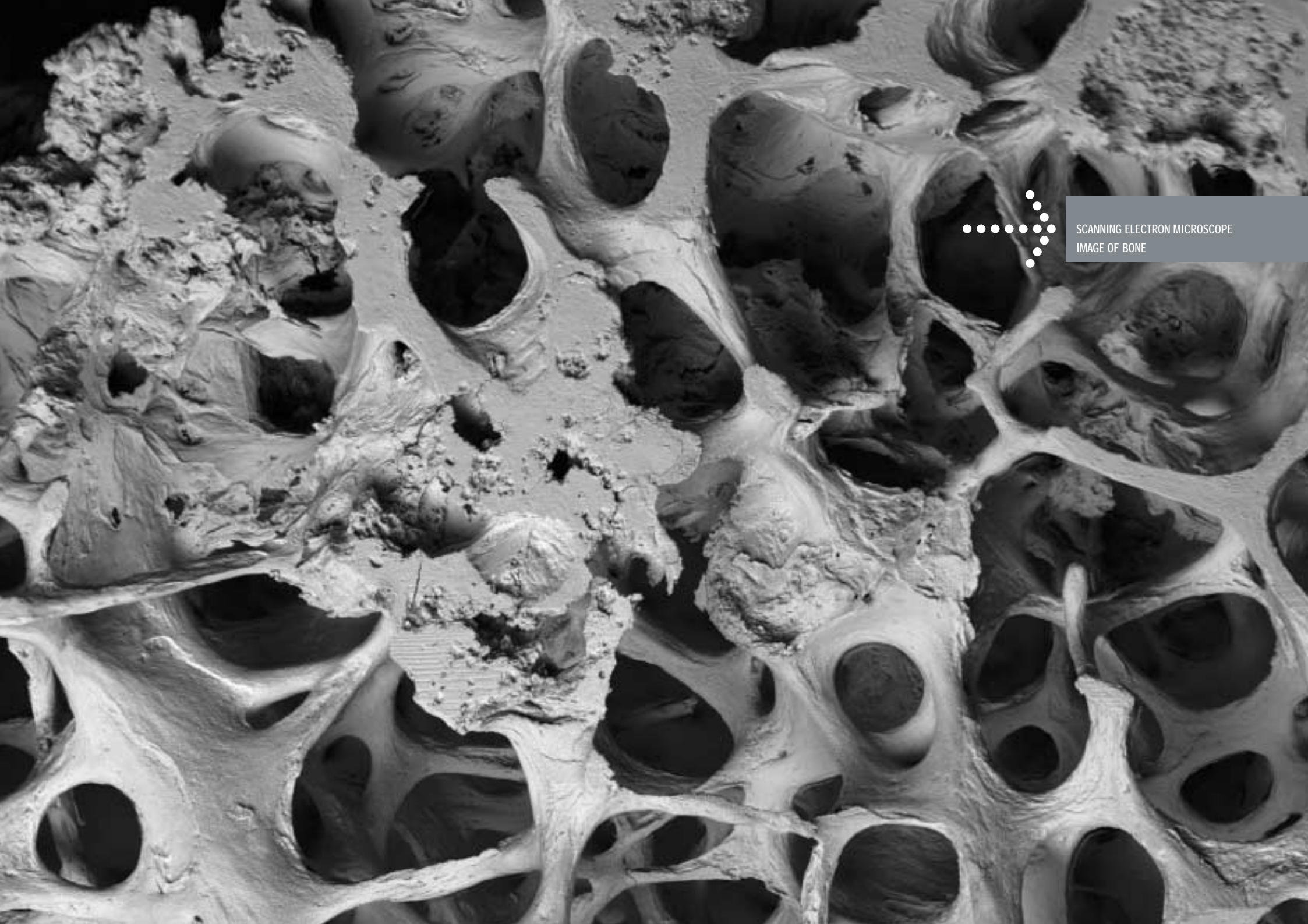
In addition, if you capture your source images by Scanning Electron Microscope (SEM), a newly-developed extension to the Scan Align function automatically detects and compensates for the inherent change in angular magnification as focus is moved through a very deep sample. This function will also compensate for the small change in focal length when using a modern internally-focused macro lens.
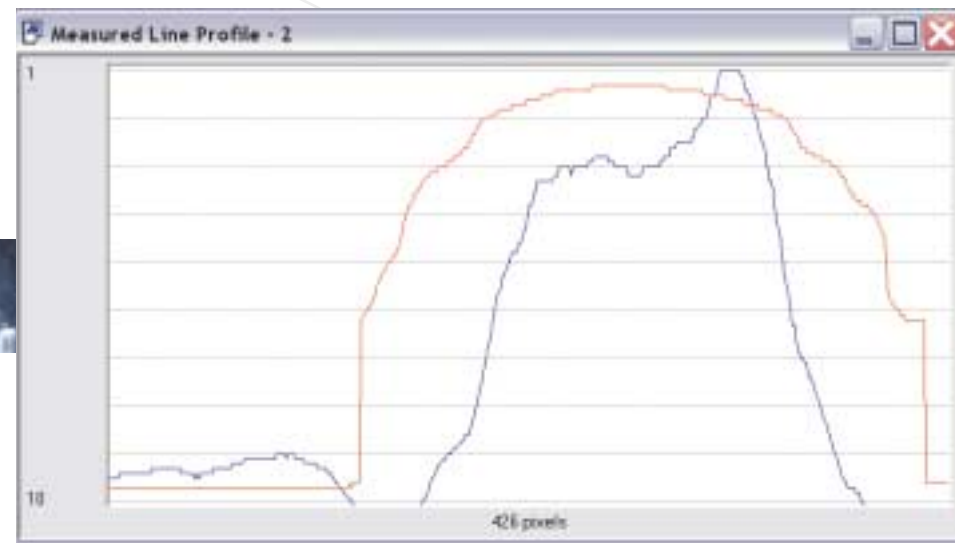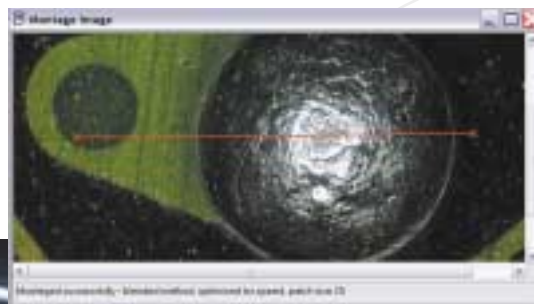
Scan Enhance and Editing

Auto-Montage Pro includes powerful editing and image manipulation tools. The Scan Enhance function provides controls for sharpening, brightness and contrast, as well as the ability to alter the colour balance. Auto-Montage Pro also includes comprehensive image editing functions. Both of these features save valuable time, in producing publication quality images, without the need to export image files to third party image editing software.

Saving and Printing your Results

All of the generated images can be printed or saved. They can also be automatically exported to other software for use in reports or presentations.

Viewing your Image

Anaglyph

Using the Scan Anaglyph feature, Auto-Montage Pro allows you to see your sample, with the aid of 3-D glasses, as a true 3-D representation. This unique function allows your samples to come to life and highlights interesting areas which might otherwise be lost.

Stereo Pair

The Scan Stereo Pair operation generates the stereo pair image, which when viewed correctly offers a 3-dimensional colour view of the montage image.

Confidence Map

Unique to Auto-Montage Pro, the View Confidence function provides a Confidence Map of your sample. The Confidence Map displays the accuracy of the final in-focus image. By shading areas of low confidence in black, and those of high confidence in white, you can quickly select the areas of highest confidence when making precise sample measurements.

Syncroscopy also offers a number of options for capturing and viewing your image that can be added to your Auto-Montage Pro software. These include:

Capturing your Image - Quantage

If your samples have a high dynamic range - that is, if they contain some regions that are very bright and others that are very dark, then no single camera exposure setting will give you reliable information in both bright and dark areas. Quantage can help you solve this problem. Quantage is the latest patented, innovative development from the Syncroscopy team. Quantage takes control of the camera and automatically records several images using different exposure conditions, and then combines the separate images into a single resultant image. The result is a colour Quantage image, of huge dynamic range, that captures contrast from the whole range of brightness levels of the sample. Although the dynamic range is too large for the human eye to appreciate, Auto Montage can use contrast throughout the dynamic range to determine focus and therefore height information.

Viewing your Image - 3-D Model Option

When working with opaque samples like metals, crystals and bone, the View 3-D Model feature can be used to create a 3-D surface model of the sample that can be viewed from any angle. This view of the sample is excellent for looking at fine details, and viewing specific areas of interest such as stress fractures and surface scratches. The 3-D View model can also be exported as an image file, enabling it to be included in Word document reports or PowerPoint presentations.

3-D VIEW IMAGE OF FRACTURED GLASS

Measurements Option

Auto-Montage Pro's powerful Measurements option enables you to automatically measure a range of X, Y, & Z parameters quickly and easily. Using your mouse to draw on any Montage image or source image you can perform single point measurements.

Good calibration is essential for accurate measurements and by using Auto-Montage Pro you can easily calibrate your sample with a standard stage graticule, or a specimen of known size. Alternatively, if you have already calibrated your camera and microscope you can save time by selecting a calibration from the Preset Calibrations list.

If you are using a calibrated Z stepper, you can use the Z-stepper property page in Auto-Montage Pro to configure your Z-stepper, thus ensuring precise automated measurements in the Z-axis.

Each of your measurement results is displayed on a status bar and to save time is automatically recorded in a table under each image. The table can then be saved as a text file, or can be rapidly exported to Excel for further analysis.

Using the View Line Profile feature, you can generate a graph showing the profile of the currently selected straight-line measurement. This provides useful information about the height profile of the surface of a material.

Auto-Montage Pro comes complete with the following:

| Feature	Benefit
Automatic image capture from camera	Saves time with file manipulation
Precise, automated image reconstruction	Perfectly focused image
User image collection calibration	Rapid, reproducible set up
Interface with icons	Simple to use
Split image/interface viewing	Effortless image manipulation
Choice of Montage Methods	Optimum image for each sample
Range of ways to view focused image	Clear, easy to measure images
Optional X, Y, Z measurement	Quick length, depth and volume sizing
Dedicated image enhancing tools	High quality images
Compatible with other software packages	Easy to export data
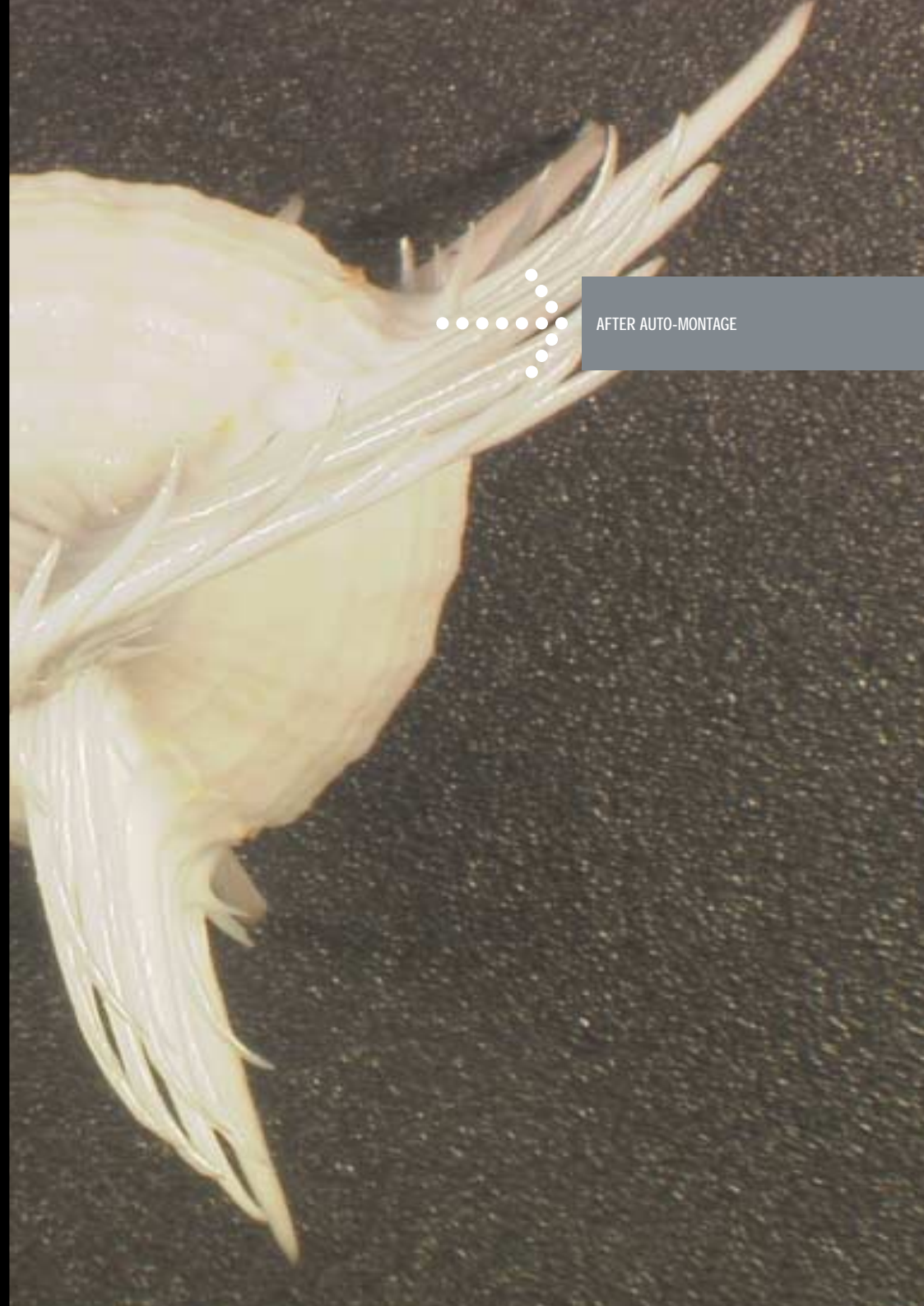
Auto-Montage Essentials

Auto-Montage is also offered as an entry level version for those users who just need a basic tool to produce in-focus images of 3-D samples. Auto-Montage Essentials has limited functionality compared to Auto-Montage Pro but will enable you to improve your imaging capability and allow you to create quality images.

Users of Auto-Montage Essentials can easily upgrade to Auto-Montage Pro to take advantage of all the advanced features offered by the professional package.
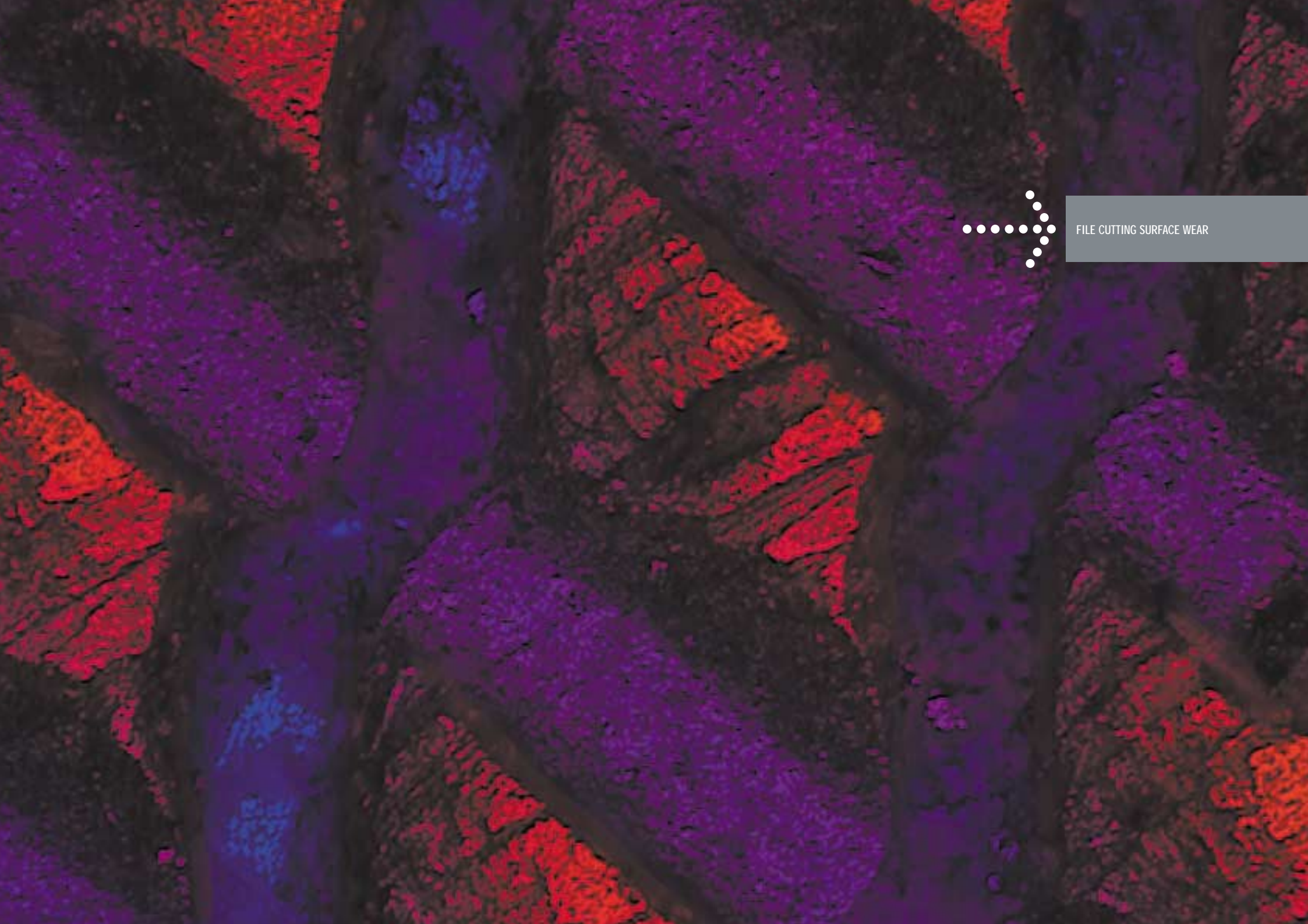
FILE CUTTING SURFACE WEAR
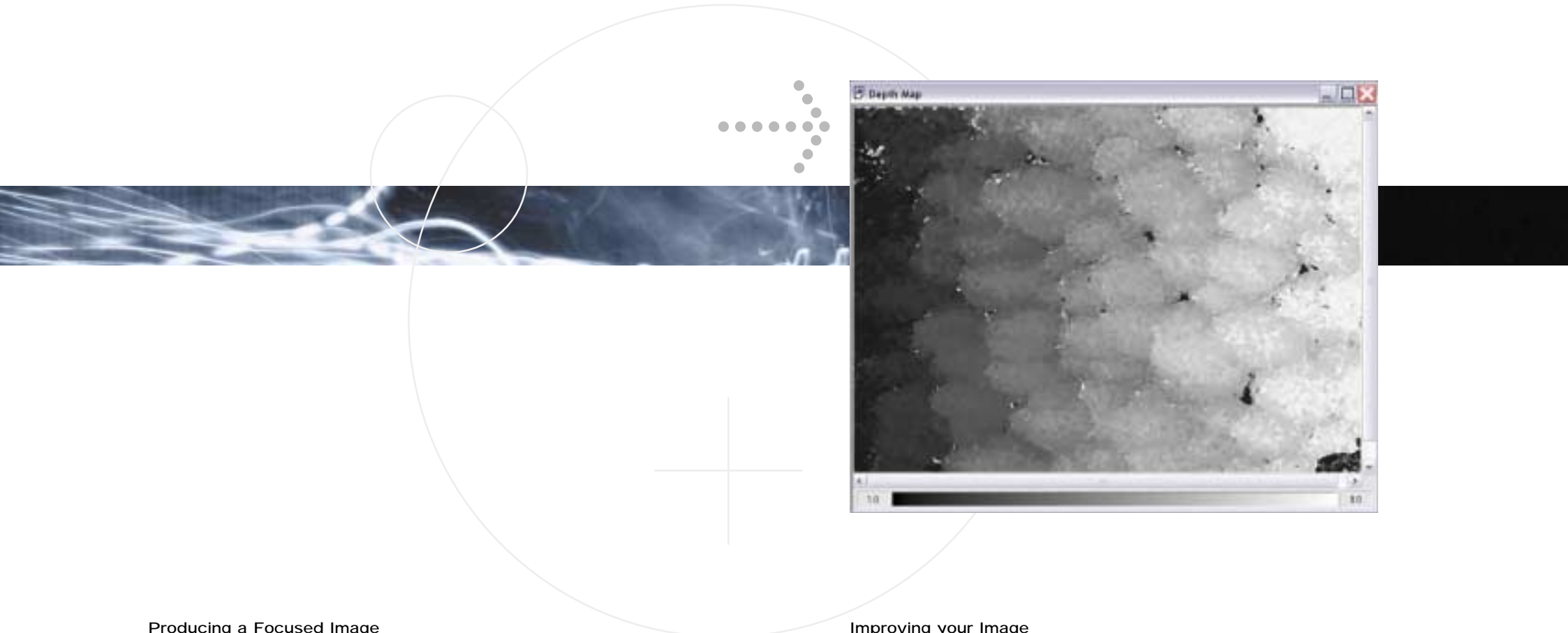
Producing a Focused Image

With Auto-Montage Essentials you can open BMP, TIFF or JPEG source image files captured by any digital camera. Using the Scan Montage function, Auto-Montage Essentials analyses and selects the in-focus areas from each source image. It then combines them to produce a fully focused image. It's as simple as that!

Viewing your Image

As well as viewing the fully focused resultant image directly, there is also the useful Scan Anaglyph feature. This function in Auto-Montage Essentials allows you to view your sample with the aid of 3-D glasses as a true 3-D image. This provides a truly unique representation of depth data and saves time by making it easier for you to detect areas of interest within the sample.

Improving your Image

A poorly aligned final image is an inherent problem if you are working with a stereo microscope. This is caused by the changes in position (parallax error) that occur during the capture of source images. Using the Scan Align function in Auto-Montage Essentials you can automatically compensate for parallax error to improve the accuracy of your final image. Additionally, if your source images have been derived photographically and then scanned in, the Scan Align function will also correct any errors in registration between frames to generate an aligned image.

With some single colour samples, it can be difficult to see which source image provided the detail for your resultant, fully focused, Montage image. As part of the Scan Montage operation, Auto-Montage Essentials automatically generates a Depth Map image. This is a record of which source image provided the in-focus region for the Montage image.
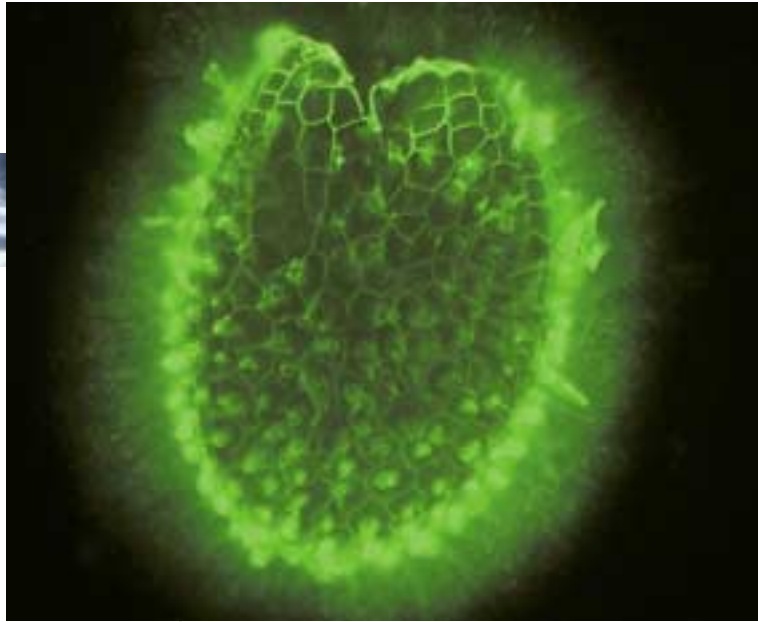
Auto-Montage Essentials also includes comprehensive image editing functions. These features save valuable time in producing publication quality images, without the need to export image files to image editing software.

Saving and Printing your Results

All source images, and the resultant fully focused images can be easily printed or saved in a range of file formats for use with other software such as Word for reports or PowerPoint for presentations.

Auto-Montage Essentials offers you all this:

Feature	Benefit
Uses images from any optical microscope	Flexible and cost-effective
Automatically produces in-focus images	Saves time manipulating data
Produces an anaglyph view	Accurate 3-D representation
Range of image enhancing tools	High quality images
Compatible with other software packages	Easy to export images
Optional upgrade to Auto-Montage Pro	Extends imaging applications

Auto-Montage Pro System

Do you:

- Want to quickly produce in-focus images of 3-D samples?
- Need to produce images and reports of many 3-D samples per day?
- Want integrated software, digital camera, and Z-stepper for your microscope?
- Want fully automated image capture?
- Want accurate sample measurement?
- Require different views of your focused image?

Say **yes** to any of these questions and there is an
Auto-Montage Pro System that is the right choice for you.

Auto-Montage Pro Systems offer all the benefits of the powerful Auto-Montage Pro software, plus an integrated package of an automated Z-stepper, linked to a high quality digital camera for fully automated image capture and analysis.

An Auto-Montage Pro system saves time and effort in setting up and focusing a microscope. Since the Z-stepper is fully integrated it is also automatically calibrated in the Z-axis. This ensures depth measurements are accurate. As the Z-stepper focuses your microscope, the Auto-Montage Pro software automatically captures, analyses and combines all of the in-focus sections of your source images, to rapidly produce one composite, perfectly focused, montage image.

Here's what an Auto-Montage Pro system offers you:

Feature	Benefit
Integrated digital camera	Direct image capture to Auto-Montage Pro
High resolution	Quality source images
Automatic image reconstruction	Perfectly focused image
Automated Z-stepper	Saves time with focusing
Calibrated Z-stepper	Accurate depth measurements
User image collection calibration	Rapid, reproducible set up
Interface with icons	Simple to use
Split image/interface viewing	Effortless image manipulation
Choice of Montage Methods	Optimum image for each sample
Many ways to view focused image	Clear, easy to measure images
Automated X, Y, Z measurement	Quick length, depth and volume sizing
Dedicated image enhancing tools	High quality images
Compatible with other software	Easy to export data
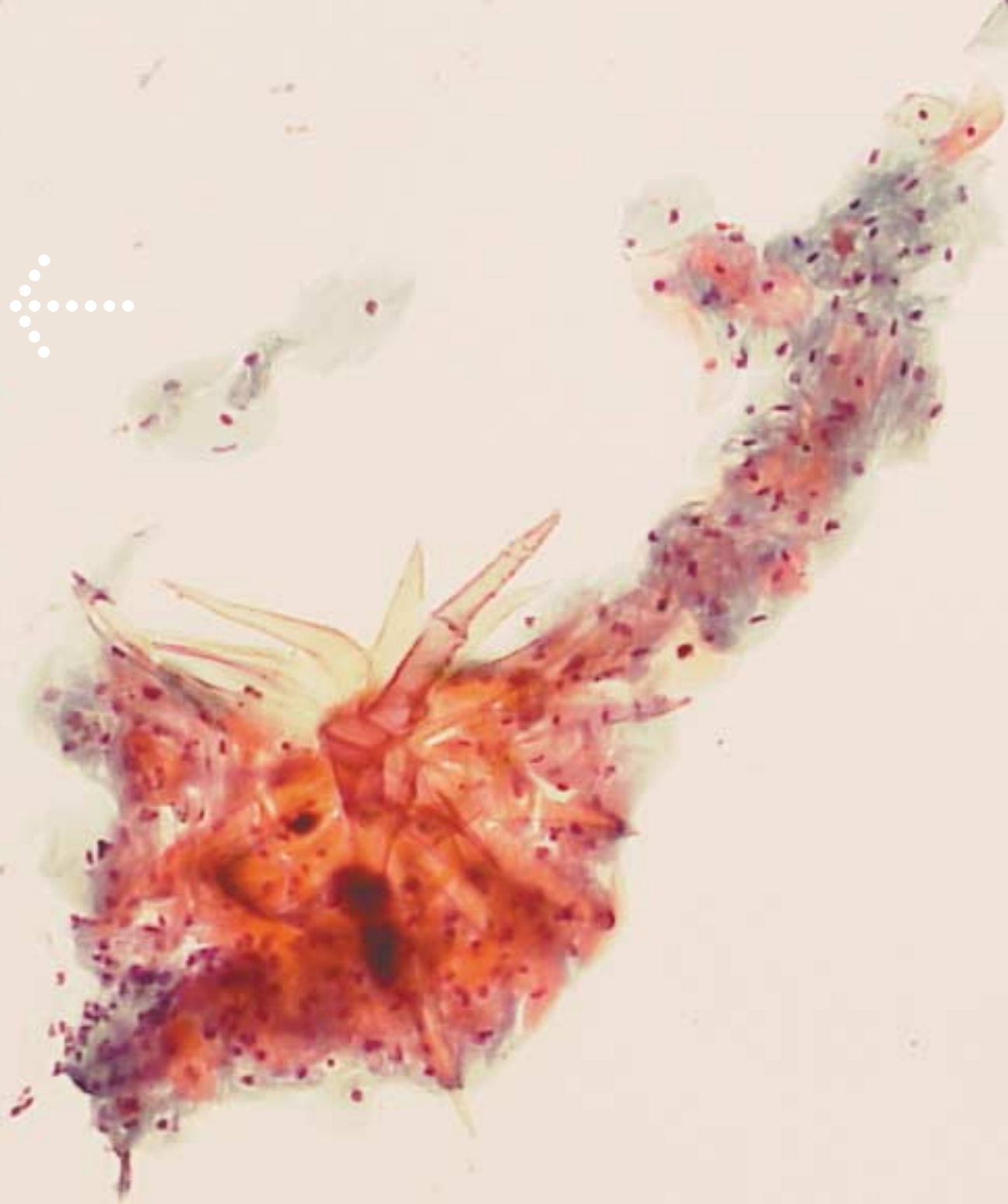
Researchers world-wide have chosen Auto-Montage to produce images for a wide variety of applications. Here's what some of them have to say about the performance of this exceptional software:

"Using Auto-Montage is helping us rapidly catalogue more than 11,000 known ant species. It is not only saving time by automating the process, but it also produces quality, in depth images, a task we have found impossible with other methods,"

Dr. Gary Alpert, Harvard University, USA.

"Before we had Auto-Montage we had to manually cut and paste in-focus sections of photos taken with a conventional camera and then re-photograph the montage. This made it tricky and time consuming to obtain a focused microfossil image. Using Auto-Montage has meant we can capture images at different focal depths in rock and can generate precise in-focus images quickly and simply."

Owen Green, Department of Earth Sciences, University of Oxford, UK.

"We use Auto-Montage to generate important views of unique early human skeletons that are millions of years old. Producing such images of their bone and tooth tissues is significantly advancing our knowledge of human evolutionary history."

Professor Timothy Bromage, Hunter College, CUNY, USA.

"With Auto-Montage software we no longer spend valuable time overlaying fingerprint photographs to get a complete fingerprint mark from a curved surface. One of the benefits of Auto-Montage for our fingerprint work is that we can use it to enhance images to see the fine detail, which is crucial for making fingerprint matches."

Esther Neate, Wiltshire Police, UK.

Software features

	Essentials	Pro
Suitable for a wide range of applications	Y	Y
Open images from another application	Y	Y
Import your own stored images	Y	Y
Suitable for SEM images	N	Y
Automatic capture from camera	N	Y
Able to use Z Stepper	N	Y
Preview window	Y	Y
Scan Alignment	Y	Y
Export image	Y	Y
Despeckle source images	N	Y
Scan montage speed option	Y	Y
Scan montage precision option	N	Y
Scan enhance	N	Y
Scan anaglyph	Y	Y
Scan stereo pair	N	Y
Scan colour relief	N	Y
Montage editing	Y	Y
Confidence map	N	Y
Depth map	Y	Y
Depth profile	N	Y
Data reporting	N	Y
Upgrades available	Y	Y
Workspaces for smart screenshots	N	Y
Measurements option available	N	Y
3D Viewer option available	N	Y

When you have chosen an Auto-Montage software or system to fit
your needs, please contact us or one of our dealers for more information
and a demonstration.

SYNCROSCOPY

A DIVISION OF THE SYNOPTICS GROUP