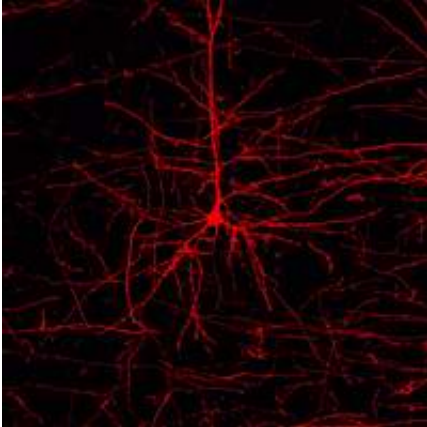# Joining pieces in a small world

August 1 2004

High resolution or a comprehensive overview – either of these is important in [microscopy](#). The user has to decide which is best every time. A unique software program makes this difficult choice unnecessary: **Images can be magnified to almost any size with no loss of quality**.

To see the world from a different perspective – the desire seems to be as old as humanity itself. To take off through the air, casting one's gaze across the endless sweep of the universe or upon the no less exciting realm of the microcosm. But a glimpse into the world of small things is destined to be limited, either by the small section of the microscopic image or by its resolution. High-resolution imaging of large-area samples generates a tremendous spate of images. It is a tedious task to evaluate

them and to archive them systematically.

Multiple Image Tools GmbH offers a solution that is based on work by the Fraunhofer Institute for Computer Graphics Research IGD in Rostock. It recently launched the "Multiple Image Stack Browser" software on the market, enabling microscopic images to be magnified to almost any size with no loss of quality. The managing director Christian Götze, who is also a mathematician, explains how the program works: "The software actuates the motorized stage of the attached microscope, creating individual images and associated metafiles from the image data. Then these pieces are fitted together to make the whole picture." Depending on the type of microscope, this image may display a fourth spatial dimension in addition to the three we are familiar with, such as differing spectral ranges or imaging techniques. The software also analyzes the overall image. "The great thing is that the analysis can be performed in exactly the same way as for small individual images, even though we are dealing with data volumes of up to ten gigabytes per image," Christian Götze explains. "That means that we can continue to use all analysis methods without restriction."

There is a broad spectrum of possible applications. In the automobile industry, for example, paint quality has up to now been checked by painstaking analysis of countless individual images. The software makes it possible to determine the number of flaws semi- or fully automatically by looking at the overall picture. In neurobiology, too, the method has aroused considerable interest. It can take a whole day for a practiced eye to count the extensions of multiple neurons and measure their lengths. By contrast, an evaluation with the newly developed procedure runs virtually by itself and is completed in only one hour. Not only that, but it drastically reduces the error quota – which can easily be 30 to 40 percent for counts performed in the conventional way.

Source: Fraunhofer-Gesellschaft