

A novel method for automating serial sectioning for volume microscopy

ATUMtome was developed by Harvard neuroscientists (Professor Jeff Lichtman and his team) and is being manufactured under license by RMC Products in the USA. ATUMtome facilitates efficient sectioning and handling of thousands of sections that permit 3-D reconstruction of large volumes of biological materials. It also provides a unique tape collecting method that allows sections to be stored for later processing and examination.

The ATUMtome is in an early adopter phase and across the world scientists are sharing information to develop new applications and protocols. Many of the early adopters of the ATUMtome are using the system for neuroscience research. However, the system's unique ability to collect hundreds to thousands of sections on a continuous tape opens the door for use in many serial section applications. By increasing the efficiency in obtaining serial sections and retaining them for future analysis, the ATUMtome is an exciting tool to consider especially among scientists who have wanted to do 3-D reconstruction but were held back because of the impractical effort it would take to handle all the sections needed. Also, scientists who need to retain the sections for future analysis will find the ATUMtome an ideal solution.

The RMC ATUMtome operates with an ultramicrotome and diamond knife included in the system. Typically, researchers mount resin-embedded specimens on the ultramicrotome, cutting serial sections that then float on a water surface in the diamond knife trough. The ATUMtome moves continuous ribbon of tape through this water trough, automatically removing the serial sections in sequential order. After the sections are collected, researchers mount the tape strips onto substrates like silicon wafers or glass slides. The populated wafers are now ready for imaging with a scanning electron microscope. ATUM sectioning and the results from various samples will be discussed followed by a question and answer session.