

## Scanning Electron Microscopy in forensic investigations: More views from more applications

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The purpose of this presentation is to expand and highlight the range of applications of scanning electron microscopy to forensic science, following the overview which was shown last year at the LXX SIAI Congress. All examples shown of forensic uses of SEM were carried out over the last few years at the Human Morphology Laboratory of the University of Insubria. These studies include:

- The identification and characterization of different toolmarks found on human bones. Some toolmarks have a distinctive morphology and allow a reliable identification of the weapon or instrument used. For this purpose, we will illustrate a few examples of dismemberment with different types of saw and will show the peculiar bone patterns left by different cutting edges (knives, axes, cutters ...);

- The examination of human tissues and of medical devices (catheters etc.) for the early detection and identification of slow-growing microorganisms (e.g. some fungi). The diagnosis of these microorganisms would have otherwise required molecular biology techniques, which are not only expensive but also not always available or applicable in the field of forensics (for instance, when the specimen is inadequate for external contaminations or is into a state of conservation far from optimal), or conventional cultures *in vitro*, which require much longer times and may be easily spoiled by inopportune drug administration;

- The use of scanning electron microscopy and of X-ray spectroscopy as auxiliary and "creative" tools to discover mystifications and frauds against insurance companies.

Keywords

Scanning Electron Microscopy, Forensic Science