



B174 Compilation of Human Hair Characteristics

*Robin T. Bowen, MA**, West Virginia University, Oglebay Hall,
PO Box 6217, Morgantown, WV 26506-6217; and *Elizabeth Brooks, MA*, Australian Federal Police, GPO Box
5218, SYDNEY, NSW 200 1, AUSTRALIA

The goal of this presentation is to present the forensic community with an example of obtaining and compiling microscopical human hair characteristics.

This research will impact the forensic science community by providing a new methodology to referencing human hair characteristics.

This paper will present the work done by the author of the Australian Federal Police, in conjunction with the Scientific Working Group on Materials Analysis (SWGMAT) Expert Hair Panel. The panel was organized to provide resources and research in forensic hair examination leading to best laboratory and interpretive practices.

It was determined that a common reference database would be useful for examiners to use when microscopically examining human hairs. Currently, a similar animal hair database was deemed as less useful. The focus of the database surrounds pattern classification, matching, and color analysis. Forensic scientists should make use of a limited palette when describing the color of an item of evidence. Color may be attributed to an object in both subjective and objective manners using the Munsell or CIE Lab color coordinates. Common hair features, as described by SWGMAT and the Expert Hair Panel, are used as the descriptive search tools. Hairs will not be linked to individuals and the information provided omits descriptors of race, sex, and ethnicity.

In preparation for creating such a database, many techniques were tested in order to provide the highest quality image possible. Digital imaging and traditional microscopy techniques were tested with relation to developing numerical features for forensic hair examination. A combination of comparison microscopes, digital cameras, and software packages were utilized during this process. Once the optimal setup was achieved, image manipulation software was chosen based on the extraction techniques and results as opposed to the ability to actually *change* an image.

An important aspect of the methods used was consistency. Some constant factors include automatic exposure, white balance, optimizing by precision as opposed to speed, and use of oil immersion lenses. Another important feature is the use of image analysis as opposed to image *enhancement*. Photo montaging was the process used to achieve quality layered images. This process helps to eliminate background noise from the images. Eliminating the background allows the focus to be on the hair, color, and the specific characteristics.

This research provides the forensic science community with a new methodology to referencing human hair characteristics. The databases of common hair features and specific human hair characteristics will serve examiners in practice by providing a visual reference. As the database develops, it will allow practitioners to add images using a specific protocol that serve as useful visual references. Such a database will provide a visual standard of what we are looking for in terms of hair examinations and specific characteristics.

Microscopy, Human Hair, Reference Databases