Dermatoglyphics!

Dermatoglyphics (from Ancient Greek derma, "skin", and glyph, "carving") is the scientific study of fingerprints, lines, mounts and shapes of hands. I did my Master's thesis on dermatoglyphics in Downs Syndrome populations. It's really quite interesting. In my classes, I used to demonstrate the idea of projections based on sampling by having students take and analyze their fingerprints. Then, I would reveal four predictions of what the results would be (hidden behind the world map at the front of the room). And voila! The predictions would almost always be correct...without knowing what the students' results would be beforehand. It was messy, but a fun demonstration. Jan Evangelista Purkyně, a Czech anatomist, initiated the science in 1823.

It turns out that there are three basic patterns of fingerprints: whorls, loops, and arches, although there are plenty of subcategories. People differ in their prints from individual to individual. One person might have all whorls; another may have 5 loops, 4 whorls, and 1 arch. This is in addition to analyzing the ridges that make up these patterns.

For the scientist, individual prints are not as important as population sample prints. From those, general observations may be made for the whole group. Thus, it's been found, for example, that males tend to have more whorls; females more arches; etc. Those population characteristics can then be used as a factor in identifying sex, race, and smaller specific populations.

Dermatoglyphics is also studied as a possible indicator of various diseases and mental conditions. Not much headway has been made in this area, but there are some different frequencies in patterns noted among Down's Syndrome groups, among others.

Fingerprints, of course, are now commonly used in forensic science, but the same type of patterns are to be seen on the toes and soles of the feet (which is why hospitals take the footprints of newborns; this was traditionally done with ink and paper, but hospitals are now switching to digital scans). The latter patterns haven't been studied as well as palm and digital fingerprints simply because it's much more difficult to access that part of the body.

The FBI has some 31 million fingerprints on file.