

## **Research Interests, May 2017**

**Asst.Prof.Dr. Hüseyin Sevay**

My recent research focus has been on (1) the automation of the derivation of forensic statistical formulas for relationship/kinship testing and (2) population genetics. In the automation of relationship/kinship testing, we develop software packages that can derive symbolic formulas for likelihood ratio computation of two given people being related at a given DNA short tandem repeat (STR) locus. This derivation process is complicated by occurrences of possible mutations and silent alleles. One of our goals is to progressively improve our existing systems such that the system can explain its reasoning while conducting a particular relationship testing scenario potentially using Artificial Intelligence techniques. Another one of our goals is to develop a *smart* system that can guide the analysis in a given relationship testing scenario.

In population genetics, we are primarily interested in comparing the Turkish Cypriot population to others in the region and elsewhere and comment on the origins of the Turkish Cypriot populations based on historical and archeological data, besides providing an anthropological perspective.

We have been conducting population genetics research in collaboration with our colleagues at the State DNA Laboratory. We also have been collaborating with other researchers in the field to consider populations elsewhere in the world. Among work we conduct in this particular research focus is haplogroup predictions using specialized software that considers Y-chromosome STR loci. We also employ other specialized software for performing population differentiation.

Exclusively we have been developing our software packages on the GNU/Linux platform using the Python general purpose language, besides other supporting languages for achieving automation.

Our collaborations have so far resulted in four internationally recognized publications.

In addition to DNA work, I am interested in using image processing techniques in conducting traffic counts at junctions of different types using live video streams. Automation of traffic counting is very beneficial to traffic engineering work. Being able to monitor the traffic volumes at a given junction or road section over a relatively long period of time can enable traffic engineers make better choices about problems related to junction capacity. In addition, junction capacity analysis based on international standards can also be automated using software. Usually, the price of such software may be prohibitive. Therefore, local capacity building in such analysis is of great interest to me.