Abstract

Deoxyribonucleic acid (DNA) profiling has become a powerful tool for human identification since its introduction by Sir Alec Jeffrey in 1985. Along with the amassing of large databases of DNA profiles from previously convicted offenders or unsolved criminal cases, DNA database search has played an important role in suspect identification for solving crimes. With the aim of bridging the gap between DNA mixture analysis and DNA database search, we propose a novel approach for evaluating the evidentiary values of “cold hits” in a database search based on DNA mixtures. General formulae are developed for the calculation of the likelihood ratio for a two-person mixture under general situations including multiple matches, non-uniform priors, and presence of missing data. As demonstrated by numerical examples on constructed murder cases, our approach is capable of presenting the forensic evidence of DNA mixtures from database search in a comprehensive way. The effectiveness of the search is evaluated by the calculation of the probability of erroneous attribution. We also present how the familial database search can be applied in mixture cases when no perfect match is found in the search, aiming at identifying the relative of the perpetrator. A simulation study is carried out to analyze the performance of the familial search. We also suggest a simple strategy to determine the least number of individuals that should be included in the crime investigation, thereby achieving desirable crime-solving rate with reasonable cost.

on

Monday, March 14, 2011

10:00 a.m. – 11:00 a.m.

at

Room 524, Meng Wah Complex
(behind the Chong Yuet Ming Amenities Centre)

Visitors Please Note that the University has limited parking space. If you are driving please call the Department at 2859 2466 for parking arrangement.

All interested are welcome