Statistical Engineering Division Seminar

Thursday April 6, 1995 1:30 pm
Admin Bldg., Lecture Room E
NIST
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DNA Fingerprinting: Measuring the Weight of the Evidence

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Forensic scientists have used genetic material (DNA) as evidence in criminal cases such as rape and murder since the middle of the last decade. DNA fingerprint profiles do not uniquely identify individuals. Therefore, for criminal cases involving DNA evidence, forensic scientists evaluate the weight of the evidence by estimating the profile's frequency in a given reference population. Although the weight of the evidence depends on the choice of the reference population, it is often not clear which database, if any, is appropriate. In practice, the probability calculation is often made using each of the major ethnic groups (races) as a reference population. Each of these populations is heterogeneous, being composed of subpopulations of different heritages. This heterogeneity has an impact on the weight of the evidence, especially when the perpetrator is believed to be from a specific subpopulation. We examine the effect of heterogeneity on the probability calculations.

Kathryn Roeder, Associate Professor of Statistics at Carnegie Mellon University, received her PhD in Statistics from The Pennsylvania State University in 1988. She was a professor at Yale University for 6 years before moving to CMU. Since 1989 Dr. Roeder has been studying the population genetic and statistical issues surrounding DNA fingerprinting. In collaboration with Bernie Devlin and Neil Risch, Dr. Roeder has written a number of influential articles on this topic, including 4 that were published in Science. She also authored a widely read review article which appeared in Statistical Science (1994). Many of these articles are routinely cited in court. Dr. Roeder was recently invited to make a special presentation for the NRC panel on DNA fingerprinting. In 1992 Dr. Roeder was awarded a National Young Investigator Prize from the National Science Foundation. She is currently an associate editor of the Journal of the American Statistical Association and is author/coauthor of more than 30 published articles and technical reports. She has delivered more 35 invited lectures, including a lecture on DNA for the Purdue University's School of Science, 120'th Anniversary Lecture series: Science and Society . Her research interests are statistical applications in molecular biology, graphical diagnostics, mixture models (latent class models), and semiparametric inference.

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