Title: Democratizing genetic surveillance

We are entering an era of ubiquitous genetic information for research, clinical care and personal curiosity. Sharing these datasets is vital for progress in biomedical research. However, a growing concern is the ability to protect the genetic privacy of the data originators. Here, I will present an overview of genetic privacy breaching strategies. First, I will show the ability to infer surname from genomic datasets of males using simple Internet searches. Second, I will present a new technique to create ultra-rapid genetic sketches of individuals using mobile DNA sensors. We developed a Bayesian algorithm that matches these noisy sketches to a database in order to identidy individuals. Testing these algorithm with empirical data returned nearly perfect sensitivity and specificity of matching a person within minutes. This technique breaks the monopoly of labs for DNA identification and facilitates the democratization of genetic identification. Third, I will show that common data privacy techniques such as redaction and differential privacy do not work well for genteic data. As an alternative method to zero-sum game of privacy versus data utility, I will propose focusing on trust-enabling technologies. I will show our website called DNA.Land for massive crowd-sourcing data of a large number of participants and demonstrate the trust-enabling concepts.