

1116-11-1194 **Kristin Estella Lauter*** (klauter@microsoft.com). *How to Keep your Genome Secret.*

Over the last 10 years, the cost of sequencing the human genome has come down to around \$1,000 per person. Human genomic data is a gold-mine of information, potentially unlocking the secrets to human health and longevity. As a society, we face ethical and privacy questions related to how to handle human genomic data. Should it be aggregated and made available for medical research? What are the risks to individual's privacy? This talk will describe a mathematical solution for securely handling computation on genomic data, and highlight the results of a recent international contest in this area. The solution uses "Homomorphic Encryption", based on hard problems in number theory related to lattices. This application highlights the importance of a new class of hard problems in number theory to be solved. (Received September 17, 2015)