Statistical Methods for High-Dimensional Genomic Data

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Technological advances in high-density genome scans have made it feasible for genomic studies to have data on millions of genetic markers for thousands of individuals. While genetic studies for the identification of genes that are involved with complex traits and diseases have primarily focused on populations of European descent, more recent studies involve populations with admixed ancestry, such as African Americans and Hispanics. Genetic studies in ancestrally admixed populations offer exciting opportunities for the identification of novel genetic variants that underlie trait diversity. At the same time, the heterogeneous genetic background and dependencies among sample individuals from admixed populations, including both ancestry differences and relatedness among sample individuals, pose special challenges for gene mapping. In these circumstances, it is necessary to devise statistical methods for high-dimensional genomic data that account for the diverse genomes of the sample individuals and are robust in the presence of a variety of complex sample structures. We will present some statistical approaches for the analysis of large-scale genomic data from populations with admixed ancestry. We will also demonstrate the utility of the methods in applications to African American and Hispanic samples from the Women's Health Initiate study.

Biography

Timothy Thornton is an Assistant Professor in the Department of Biostatistics and Institute for Public Health Genetics at the University of Washington. He is also an Affiliate Investigator at the Fred Hutchinson Cancer Research Center in Seattle. The focus of his research is the development and application of statistical methods for the identification of genetic variants underpinning complex traits and diseases. His research lab also develops software for the statistical analysis of large-scale genotyping data. Prior to joining the faculty at the University of Washington, Dr. Thornton was a University of California President's Postdoctoral Fellow in the Department of Statistics at the University of California at Berkeley. He earned a B.S. degree in mathematics from Hampton University and a Ph.D. in statistics from the University of Chicago. Dr. Thornton is currently a principal investigator (PI) of a National Cancer Institute funded Career Development Award (K01) and co-PI of a National Institute of General Medical Sciences funded Project Grant (P01). He was born in Hampton, Virginia.