

HSPH Mini-Course on Genome-Wide and Pathway-based Association Studies of Complex Diseases

Course Organizer: Dr. Tianhua Niu

Co-Sponsored by: HSPH Bioinformatics Core and Program in Molecular and Genetic Epidemiology

Syllabus

With the advent of high-throughput genotyping platforms such as the Affymetrix Human SNP Array 5.0 (containing the conventional two-chip Mapping 500K SNP Array Set plus additional probes covering other genetic variations such as copy number variations), Illumina Sentrix HumanHap 650Y, 1M Genotyping BeadChips (tag SNP content providing genomic coverage) and Human CNV370-Duo DNA Analysis BeadChip (covering copy number variant regions), genome-wide association studies have been gaining increasing interests in genetic dissection of complex human diseases. Furthermore, pathway-centric studies have been recognized to provide significantly greater biological insights into the molecular mechanisms underlying disease pathogenesis than classic single-gene studies. With the rapid advances in ultra-low-cost whole genome sequencing technologies, profoundly novel study designs could be devised and implemented based on the entire human genome sequence for exploring genetic susceptibilities underlying complex diseases in large population cohorts. This mini-course gathers together pioneers in these emerging fields to address key biological and statistical issues involved in performing these studies and to present their up-to-date results for a variety of human disorders. This mini-course will offer participants a great opportunity to both gain novel knowledge and to learn new strategies in carrying out genome-wide and pathway-based association studies.

Mini-Course Schedule (April 27, 2007 – June 1, 2007)

(1) Date: Friday, April 27, 2007
Place: Kresge G3, HSPH

1:30PM-2:25PM

Lecture 1

David Hunter, MBBS, MPH, ScD
Vincent L. Gregory Professor of Cancer Prevention & Director
Program in Molecular and Genetic Epidemiology
Dept. of Epidemiology, HSPH
"Genome-Wide Association Studies of Breast Cancer"

2:35PM-3:30PM

Lecture 2

Stephen J. Chanock, MD
Senior Investigator and Director
Core Genotyping Facility, the Advanced Technology Center
National Cancer Institute
"Genome-Wide Association Studies of Prostate Cancer"

(2) Date: Friday, May 4, 2007
Place: Kresge G2, HSPH

1:30PM-2:25PM

Lecture 3

Shaun Purcell, PhD
Center for Human Genetic Research, Massachusetts General Hospital
Harvard Medical School
Program in Medical and Population Genetics, Broad Institute of Harvard and MIT
"PLINK: A Toolset for Genome-Wide Data Analysis"

2:35PM-3:30PM

Lecture 4

David Altshuler, MD, PhD
Associate Professor of Genetics and Medicine
Massachusetts General Hospital, Harvard Medical School
Director, Program in Medical and Population Genetics
Broad Institute of Harvard and MIT
"Application of HapMap in Genome-Wide Association Studies"

(3) Date: Friday, May 11, 2007
Place: Kresge G2, HSPH

1:30PM-2:25PM

Lecture 5

Christoph Lange, PhD

Assistant Professor of Biostatistics

Dept. of Epidemiology, HSPH

"PBAT: A Powerful Biostatistical Tool for Genome-Wide Association Studies"

2:35PM-3:30PM

Lecture 6

Robert Sladek, MD

Assistant Professor

Departments of Human Genetics and Medicine

McGill University

"A Genome-Wide Association Study of Type II Diabetes Mellitus"

(4) Date: Friday, May 18, 2007

Place: Kresge G2, HSPH

1:30PM-2:25PM

Lecture 7

Mark Daly, PhD

Assistant Professor of Medicine

Center for Human Genetic Research, Massachusetts General Hospital

Harvard Medical School

Program in Medical and Population Genetics, Broad Institute of Harvard and MIT

"A Genome-Wide Association Study of Inflammatory Bowel Disease"

2:35PM-3:30PM

Lecture 8

Peter Kraft, PhD

Assistant Professor of Epidemiology

Dept. of Epidemiology, HSPH

"Efficiency and Power of Multi-stage Design for Genome-Wide Association Studies"

(5) Date: Friday, May 25, 2007

Place: Kresge G3, HSPH

1:30PM-2:25PM

Lecture 9

Joel N Hirschhorn, MD, PhD

Assistant Professor of Genetics and Pediatrics, Harvard Medical School

Program in Medical and Population Genetics, Broad Institute of Harvard and MIT

"Performing and Interpreting Association Studies"

2:35PM-3:30PM

Lecture 10

Christopher J. O'Donnell, MD, MPH
NHLBI's Framingham Heart Study
Dept. of Cardiology, Massachusetts General Hospital, Harvard Medical School
"Genome Wide Association Studies for Cardiovascular Disease in Observational Cohorts"

(6) Date: Friday, June 1, 2007
Place: Kresge G3, HSPH

1:30PM-2:25PM

Lecture 11

Stacey Gabriel, PhD

Director

The Broad Institute Center for Genotyping and Analysis

Broad Institute of Harvard and MIT

"High-Throughput Genotyping Platforms for Genome-Wide and Pathway-based Genetic Association Studies"

2:35PM-3:30PM

Lecture 12

George Church, PhD

Professor of Genetics, Dept. of Genetics, Harvard Medical School

"Advanced Sequencing Technologies and the Personal Genome Project"