[KL2 Scholar Program Curriculum](#)

Ethics in Science

Topic
Introduction and Overview
Data Management and Bias
Ethics to Regulation: Animal and Human Subjects, and Stem Cells
Publication and Peer Review
Collaboration, Authorship, and Mentoring
Social Responsibility
Asking Questions and Whistleblowing

Human Genetics and Genomics

Topic
Human Genome & Forms of Genetic Variation
Sequencing Technologies & Sequence Databases
Genotyping Technologies: Human Hapmap, Genotype Databases
Applied Population Genetics
Functional Genomics
Cancer Genomics Papers
Computational Analysis of Deleterious Genetic Variations
Meiotic Mapping & Gene Discovery
Pharmacogenetics & Personalized Medicine
The Future

Molecular Medicine

Topic
How Do You Do Translational Medicine
From Garrod to Systems Biology
High-throughput Discovery of New Technologies
Cardiac Disease
Molecular Cardiology / Ion Channels
Thrombosis & Disease
Hepatitis & Liver Disease

Drug Development for Hepatitis C
Breast Cancer
Mechanisms of Metastasis
Kidney Disease
Innate Immunity in Transplantation
Genomics & Proteomics for Transplantation
HIV & AIDS in the Clinic
Biology & Novel Therapeutics for HIV
Multiple Sclerosis
Mouse Models of SLE Autoimmunity
Aging & Dementia
Protein Folding
Real Stories: Discovery of Nitric Oxide Synthase Inhibitor for Pain
Real Stories: Basic Biology in Clinical Trials in Gene Therapy for Heart Failure
Final Thoughts & Exam

Clinical Trial Design, Statistics, & Execution

Topic
Formulation of Research Hypothesis
Query of Scientific Database
Odds Ratios, Predictive Values, Absolute v. Relative Risk
Overview of Study Design I
Overview of Study Design II
Descriptive Measures & Types of Distribution
Fundamentals of Probability
Methods of Comparison, Statistical Significance, Confidence Intervals
Regression Analysis, Survival Analysis, Kaplan-Meyer Curves
Statistical Methods & Models
Sample Size Calculations & Randomization
Special Statistics for Genomics
Graphical Depiction of Statistical Results
Computerized Tools to Enable Statistical Analysis
Multicenter Trial Participation & Organization

History of Human Subject Protection
IRB Basic Principles
IRB Mock Review
Human Subject Regulatory Affairs & Trial Phases
Investigational New Drug & Device Applications
Data Retention & Protection
Ethical Conflicts Before and After the Trial
Principles of Grant Source Finding & Application
Mock Grant Review & Final