

**PSYC 5112**  
**STATISTICAL GENETICS FOR COMPLEX TRAITS**  
Spring 2007 – Course Syllabus

**Instructor**

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Office hours: Thursday 9.30am-12.00pm

**Classes**

Wednesday 9.30am-12.00pm

**Location**

IBG 210 (Seminar Room)

**Description**

The focus of this course will be on the methods for mapping complex disease genes in both population-based and family-based samples. Topics will include both linkage and association analyses of qualitative and quantitative phenotypes, with an emphasis on their application to empirical data using available computer software. Students will be exposed to the latest statistical methodology and computational resources for mapping genes underlying complex traits. They will also read and evaluate current statistical human genetics literature.

**Required Reading**

Pertinent journal articles will be distributed in class.

**Recommended Texts (*none required*)**

Texts typically vary in focus and perspective – given the rapid advances in technology and methodology, many texts become outdated very quickly. Listed below are a few recommended texts and what may be considered their focus:

*Statistics in Human Genetics* – P Sham

Good general overview, easy to follow

*Statistical Methods in Genetic Epidemiology* – DC Thomas

More recent text, provides big picture concepts, easy to read

*Mathematical and Statistical Methods for Genetic Analysis* – K Lange

Heavy on the statistics, good reference for the math underlying methods

*Gene-Mapping in Complex Human Diseases* – JL Haines and MA Pericak-Vance

Good general overview, emphasizes linkage

*Fundamentals of Genetic Epidemiology* – Khoury, Beaty and Cohen

Classic text, a bit outdated, good reference for segregation and linkage analysis

*Genetics of Populations* – PW Hedrick

Population genetics text only, no methods for gene mapping

**Evaluation**

In addition to the (approximately) weekly problem sets, a final linkage and association project will be presented at the end of the semester. Details of the project will emerge as the course progresses. Grades will be based on 50% problem sets and 50% final project.

## Course Schedule

| <b>Class</b> | <b>Topic</b>   |
|--------------|--|
| 01-17        | Course Logistics / Introduction                                      |
| 01-24        | Population Genetics – Conceptual Overview                            |
| 01-31        | Linkage Analysis – Parametric  |
| 02-07        | Linkage Analysis – Nonparametric                                     |
| 02-14        | Linkage Analysis – Quantitative Traits                               |
| 02-21        | Linkage Analysis – SNPs and Future Prospects                         |
| 02-28        | Association Analysis – Conceptual Overview                           |
| 03-07        | <i>No Class – Workshop on Methodology of Twin and Family Studies</i> |
| 03-14        | Association Analysis – Population Based I                            |
| 03-21        | Association Analysis – Population Based II                           |
| 03-28        | <i>No Class – Spring Break</i>                                       |
| 04-04        | Association Analysis – Family Based I                                |
| 04-11        | Association Analysis – Family Based II                               |
| 04-18        | Association Analysis – Large Scale I                                 |
| 04-25        | Association Analysis – Large Scale II                                |
| 05-02        | <i>No Class – Work on Final Projects</i>                             |
| 05-09        | Final Project Presentations  |

## **The Fine Print**

### *Disability Statement*

If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and <http://www.Colorado.EDU/disabilityservices>.

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Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. See full details at [http://www.colorado.edu/policies/fac\\_relig.html](http://www.colorado.edu/policies/fac_relig.html).

### *Classroom Behavior*

Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to such behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat all students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which they and their students express opinions. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\\_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code).

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The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.

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All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council ([honor@colorado.edu](mailto:honor@colorado.edu); 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>.