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typically vary in focus and perspective – given the rapid advances in technology and methodology, many texts become outdated very quickly.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  Classic text, a bit outdated, good reference for segregation and linkage analysis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

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

Disability Statement
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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.

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