Analytic Methods in Genetic Epidemiology
Population Health 904 Section 003
Summer 2010, 6/1/10 – 8/6/10 (10-week session)

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Time: Monday, 2:45-4:15
Location: 1220 HSLC
Office Hours: 15 minutes before and after class or by appointment

Course Description:
This course offers a unique opportunity to take part in the international Genetic Analysis Workshop (GAW17 for 2010) (http://www.gaworkshop.org/). The purpose of the GAW is to provide an opportunity for statisticians, epidemiologists, geneticists, and other scientists to interact to address methodological issues in genetic analysis. At each GAW, an existing dataset is selected, and a set of simulated data is devised such that statistical questions of wide and current interest may be addressed. These data are made available to scientists worldwide who then report the results of their analyses of these data at the GAW meeting. The purpose of these workshops is to allow the comparison of statistical methodologies for genetic epidemiology using the same, well-described datasets. Proceedings from GAW16 were published in part by Genetic Epidemiology 33(Suppl 1), S1-S110 (2009) and in part by Biomed Central (BMC Proceedings, Volume 3, Supplement 7, 2009). The paper topics can range from development of new statistical approaches to deal with various genetic epidemiologic problems to the application of new statistical approaches that are in the literature, but have not yet been tested in real data to approaches to dealing with genotyping errors, pedigree (family structure) errors and missing data to methods for detecting interactions between genes to the effect of phenotype definition on the

results obtained (i.e., your hypothesis can be statistical, epidemiological, purely genetic or anything in between).

Course format:
You will form analysis/writing groups with 1-3 students under the guidance of at least one of the instructors/mentors in addition to the head instructor. Each group will formulate a hypothesis regarding the data provided by the GAW, test the hypothesis using an innovative analytic approach, and write up the results in a research paper format. This paper must be submitted to the GAW by *date not yet posted*. You will have the opportunity (not required, but highly encouraged especially for first authors) to participate in GAW17 in Boston on October 13-16, which includes a period of concentrated work with researchers from other institutions whose papers are similar to yours and attendance at presentations from all the working groups (many travel scholarships are awarded to students and post-docs by the GAW [you must be the 1st author of a paper to receive a scholarship]). Regardless of attendance at the Workshop, your paper will be peer-reviewed for likely publication in a journal (*BMC Proceedings* in past years). The first author and others who attend the GAW will also have a chance to be a co-author on the group summary paper that is generally published in *Genetic Epidemiology*.

During the weekly class meeting, each group will give an informal verbal and written update on their progress and any problems they are having so that we can all discuss, problem solve, and learn from each others' experiences. This meeting will be similar in format to a research group's lab meeting. An additional weekly meeting for each analysis/writing group with the group mentor will also be required.

Required readings:
- GAW17 documentation available at: http://www.gaworkshop.org/
- Literature review relevant to your hypothesis

Evaluation:

Paper submitted to GAW	50%
Participation in discussions and the project	50%

Academic Integrity:
Due to the nature of this class, sharing information with other students is not only allowed, but essential. It is expected that, within each group of authors, everyone will contribute to the final paper. Each group of authors (including the faculty mentoring the group) will discuss the order of authorship so that it is an honest reflection of the amount of effort each author contributed. As is the case with all papers, proper citation of other's work is required. Also, please remember that you are representing the University of Wisconsin in your writing and, if you choose to attend, at the GAW.

Accommodations for disabilities:
If you need accommodations due to a disability please see me as soon as possible.

Date	Topic and work for the week
Tuesday, June 1	Introduction to course project, form groups, select research question
Monday, June 7	Literature review, write Introduction section
Monday, June 14	Literature review, write Introduction section
Monday, June 21	Data QC, Table 1 (descriptives), write Methods section
Monday, June 28	Construct table shells and perform data analysis, write Methods section
Monday, July 5	Data analysis
Monday, July 12	Data analysis
Monday, July 19	Write Results section
Monday, July 26	Write Discussion section and abstract
Monday, August 2	Group presentations; Turn in final draft of manuscript by Sunday, Aug 8