Analytic Methods in Genetic Epidemiology
Population Health 904 Section 003
Summer 2010, 6/11/12 – 8/12/12 (9-week session)

Instructors: Corinne D. Engelman, MSPH, PhD
Department of Population Health Sciences
1007A WARF
608-265-5491
cengelman@wisc.edu

Kristin J. Meyers, MPH, PhD
Department of Ophthalmology and Visual Sciences
1069 WARF
608-265-2172
kjmevers2@wisc.edu

Consultants/Coauthors: Bret A. Payseur, PhD
Department of Genetics
2428 Genetics-Biotechnology Center
608-890-0867
payseur@wisc.edu

C. David Page, PhD
Department of Biostatistics and Medical Informatics
6743 Medical Sciences Center
608-265-6168
page@biostat.wisc.edu

Kris Lee, MS
Department of Ophthalmology and Visual Sciences
450 WARF
608-263-8834
klee@epi.ophth.wisc.edu

Time: TBD
Location: TBD
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 (GAW18 for 2012) (http://www.gawworkshop.org/). The purpose of the GAW is to provide an opportunity for statisticians, epidemiologists, geneticists, bioinformaticians, 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. GAW18 will focus on the analysis of whole genome sequence data. 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 GAW17 were published in part by Genetic
Epidemiology and in part by BMC Proceedings (http://www.biomedcentral.com/bmcproc/supplements/5/S9/all). 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 2-4 students, having combined expertise in genetics (human or animal), biostatistics, epidemiology, and computational sciences, under the primary mentorship of either Dr. Engelman or Dr. Meyers and consulting from the other course instructor and any/all of the course consultants/coauthors listed above. Each group will formulate a hypothesis regarding the data provided by the GAW, test the hypothesis, 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 GAW18 at The Skamania Lodge in Stevenson, WA on October 14-17, 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 (typically one travel scholarship is awarded to a student in our group by the GAW [you must be the 1st author of a paper to receive a scholarship, but there is no guarantee that you will receive one]). Regardless of attendance at the Workshop, your paper will be peer-reviewed for likely publication in a journal (BMC Proceedings in recent years). The first author and others who attend the GAW may 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:**
- GAW18 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.

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<thead>
<tr>
<th>Date</th>
<th>Topic and work for the week</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to course project, form groups, select research question</td>
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<td>Week 2</td>
<td>Literature review, write Introduction section</td>
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<td>Week 3</td>
<td>Literature review, write Introduction section</td>
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<td>Week 4</td>
<td>Data QC, Table 1 (descriptives), write Methods section</td>
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<td>Week 5</td>
<td>Construct table shells and perform data analysis, write Methods section</td>
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<td>Week 6</td>
<td>Data analysis</td>
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<td>Week 7</td>
<td>Finish data analysis and write results section</td>
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<td>Week 8</td>
<td>Write Discussion section and abstract</td>
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<td>Week 9</td>
<td>NO CLASS; Turn in final draft of manuscript by Sunday, Aug 12</td>
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