

**Analytic Methods in Genetic Epidemiology**  
**Population Health 904 Section 003**  
**Summer 2014, 6/16/14 – 8/10/14 (8-week session)**

**Instructors:** Corinne D. Engelman, MSPH, PhD  
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**Time:** Wednesday between 3 and 5 pm

**Location:** TBD based on student locations

**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 (GAW19 for 2014) (<http://www.gaworkshop.org/>). The purpose of the GAW is to provide an opportunity for statisticians, epidemiologists, geneticists, bioinformaticians, and other scientists to interact while addressing 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. GAW19 will focus on the analysis of whole genome sequence and expression data. These data are made available to scientists worldwide who then report the results of their analyses of these data at the workshop. 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 2-3 students, having combined expertise in genetics (human or animal), biostatistics, epidemiology, and computational sciences. Under mentorship of Dr. Engelman, 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 July 22. You will have the opportunity (not required, but highly encouraged especially for first authors) to participate in GAW19 at The Imperial Riding School Renaissance Hotel in Vienna on August 24-27, 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. 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 may also be necessary.

**Required readings:**

- GAW19 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.

<b>Date</b>	<b>Topic and work for the week</b>
Pre-class meeting: June 10	Introduction to course project, form groups, discuss research questions, literature review
Week 1: June 16	Literature review, draft Introduction and Methods sections, data analysis
Week 2: June 23	Literature review, draft Introduction and Methods sections, data analysis
Week 3: June 30	Methods section, data analysis
Week 4: July 7	Data analysis, create tables and figures
Week 5: July 14	Data analysis, create tables and figures, draft Results section
Week 6: July 21	Finish data analysis, tables, figures and Results section, draft Discussion
<b>July 22</b>	<b>Submit draft of manuscript to GAW19 (send to Dr. Engelman first for editing)</b>
Week 7: July 28	Draft abstract and finalize manuscript
Week 8: Aug 4	Presentation, Turn in final draft of manuscript by Sunday, Aug 10