Term Assignment: GIS in the Sciences (Spring 2013) (50% in final course grade)

- Due: Tuesday April 30, 2013 (by 5pm EST)
- Submission method: written document by email to max7@rpi.edu and Anastasia Rodzianko rodzia@rpi.edu
- Please use the following file naming for electronic submission: GIS2013_TERM_YOURFIRSTNAME_YOURLASTNAME.xxx
- Late submission policy: 20% of score deducted each late day
- Office hours: Thursday 1-2pm, Winslow 2132
- Note: Your report for this assignment must represent your own work. Take care to avoid plagiarism (‘copying’), including all web resources, texts, and class presentations. You may discuss the problems with other students, but do not take written notes during these discussions, and do not share your written solutions.

**Term Assignment Topic:** Your term projects should fall within the scope of GIS for science. This means that the work must go beyond just making a map. You should develop the project to indicate you are thinking of and exploring the spatial relationships of your data. Start with a hypothesis, think of a way to test the hypothesis, find or collect the necessary data, and do both GIS and geostatistical data analysis. It is especially important to bring together different kinds of data (this includes data types, and different disciplines, e.g. civil engineering, environment and demographic, or finance).

You do not have to come up with a positive result, i.e. disproving the hypothesis is just as good. Please use the section numbering (1-5+Figs+Refs) below for your written document for this assignment.

Example topics:
- Rate of drug arrests vs. number of officers vs. education or socio-economic levels in different regions
- Superfund sites vs. economic conditions
- Lake George sedimentation and organic carbon and invasive species
- Crime areas on campus and relation to other campus data, e.g. lighting, paths, weather
- Toxic releases in Albany Co.
- Analysis of earthquake insurance risks
- Geology, radon, and lung cancer
- Beach water quality and harmful algae blooms on California or Florida coast for different times of year/season
- Landfills vs. Income levels

If you want to generate ideas from datasets, some sources are:
- http://geo.data.gov
- http://data.geocomm.com
1. Introduction (5%)
Describe your motivation, initial hypothesis/idea that you wanted to investigate, and if applicable any prior work, interest in the topic (like an intro for a paper). Min. 1/2 page.

2. Data Description (7.5%)
Describe how you determined the datasets you used in this project, the criteria, source, data and information—types in detail including aspects of the geo-spatial nature of the data, associated metadata and any other supporting materials. Also describe data that you found, or initially tried or wanted to use, but could not/did not and why. Min. 1/2 page text.

3. Analysis (10%)
Explore the statistical aspects of your datasets. Analyze the distributions and provide summaries of the relevant statistics. Perform any transformations, interpolations, smoothing, etc. required on the data, to begin to explore your hypothesis/questions. Perform uni- and/or multivariate or similar analysis. Min. 1 page text.

4. Error Analysis (10%)
Discuss and specify or estimate possible sources of error, uncertainty or bias in the data you used (or did not use). Indicate how you calculated or estimated the propagation of errors through the various stages of your analyses. Discuss the confidence in your results including any statistic measures. Min. 1 page text.

5. Conclusions and Discussion (5%)
Provide a description of your conclusions, and add some summary discussion about your results, what changed as you went through the project (data, analysis, etc.), what you would do next, or do differently in a subsequent exploration. Min. 1/2 page text.

Graphical Representations (10%)
Provide graphical representations for each of sections 2, 3, and 4, including map-based representations of your data/results. Ensure all figures are numbered, legible, fully explained and annotated.

References - websites, papers, packages, data, etc. (2.5%)

The final document should be a minimum of 8-10 pages (but can be more). All annotated maps should be within your written assignment unless they are very large. Large maps should be sent as a separate attachment (e.g. in a zip file).