Computing Practice and Theory – Prospectus
Spring, 2013
Faculty: Judy Cushing, Aaron Skomra, Richard Weiss

See **http://blogs.evergreen.edu/cpat** for Schedule, Books & Software, etc.

This project-oriented program for intermediate and advanced computer science students will weave together theory and practice in two cross-cutting computer science areas (pattern analysis and modeling) in the context of eScience. The overriding question of the program is how pattern analysis, modeling, and statistics advance the natural and physical sciences, particularly environmental science and climate change studies. We aim to consider in particular the promises and pitfalls of "Big Data". The program aims to give students from *Computability*, *Computer Science Foundations*, and *Music, Math and Cybernetics* opportunities to continue work begun in those programs. Students who have taken *Computability* will be expected to complete more advanced work for upper division credit.

Particularly in seminar, students will share responsibility for presenting and discussing concepts from readings and lectures. The seminar will focus on how computation and statistics can have an impact on science and society through data mining, visualization, and machine learning. This program will include a guest lecture series that focuses on (how computers are used in) science. In addition to seminar, the program has two disciplinary components (1) the theory and practice of statistics, and (2) data mining, machine learning and pattern recognition, and (3) a project.

For the project, which can be either a research project or a programming project, students can opt to apply the computing and statistics to a problem of their choice, but faculty will approve any reasonable proposal where learning objectives are clear and likely to be attained, resources are available to complete the project, the project scope is appropriate, and the project is linked to some area of computer science.

Projects will begin with a proposal and bibliography, and should be either small enough in scope to be completed in one quarter or a self-contained part of a larger project. CS subdisciplines where faculty will encourage projects include data mining, machine learning, statistics, database systems, data visualization (especially visual analytics), networking, security, algorithmic complexity, and formal languages, but they will entertain any reasonable proposal where learning objectives are clear and likely to be attained, resources are available to complete the project, the project scope is appropriate, and the project is linked to some area of computer science. To facilitate projects, faculty will organize small research groups that meet twice weekly (once with a faculty advisor).

Proposed credit distribution:
4: Computing theory and practice: Advancing the Practice of Science (Seminar & Lecture).
4: Modeling and Statistics
4: Data Mining, Machine Learning and Pattern Recognition
4: Student project - research and/or programming practicum

Upper Division Science Credit: Students seeking to earn upper division credit must submit to faculty by the end of the first week of the quarter responses to a questionnaire establishing the expertise and prior learning needed to complete work at an upper level.

Wednesday, April 24, No Class so students and faculty can observe and participate in Day of Absence.