CMPT 813 - G100 Computational Geometry

Instructor(s): Tom Shermer

Calendar Objective/Description:
This course covers recent developments in discrete, combinatorial, and algorithmic geometry. Emphasis is placed on both developing general geometric techniques and solving specific problems. Open problems and applications will be discussed.

Instructor's Objectives:
Computational Geometry is, as the name indicates, the study of computation about geometric objects. It forms the basis for algorithms in graphics, vision, and robotics, to name a few fields. Its main concerns are algorithmic design, data structures, complexity, and discrete geometry. The algorithmic techniques and data structures used in computational geometry are widely varied and thus it provides a good introduction to and survey of these areas. This course will start with a quick overview of basic computational geometry techniques and thereafter will become a seminar course, with students giving seminars about papers in the reading list, and all of us discussing these papers. The papers will be a mix of classic important papers and modern just-released research. Students will be involved in the choice of papers we will read. Students will produce a term project that is either an implementation of a geometric algorithm or a theoretical endeavour. They will write and present a report on their project, and also write a 3-6 page summary of the main ideas of the course.

Prerequisites:
None

Topics:
- Convex Hulls
- Voronoi Diagrams
- Delaunay Triangulations
- Geometric Spanners
- Visibility
- Epsilon nets
- Other topics as determined by student interests

Grading:
To be discussed in the first week of classes. Roughly, 30% participation in seminars, 50% term project, report, and presentation, and 20% idea summary.

Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).