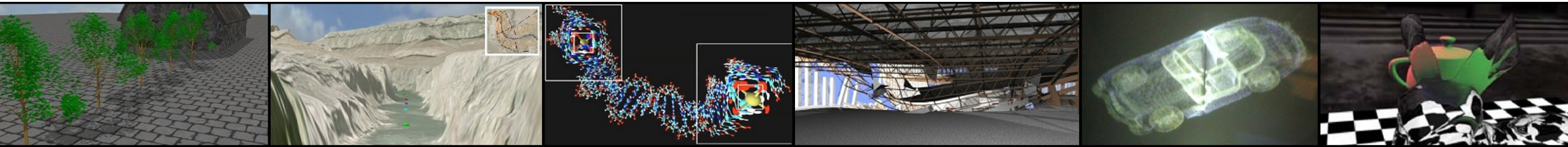
COT 4521: Introduction to Computational Geometry

Final Review Topics

Paul Rosen
Assistant Professor
University of South Florida



What you are allowed/Need

- Pen/pencil
- Cheat sheet (one) 8.5x11 front side only
- Straight edge (we have some, if you don't)

- No calculators
- No other notes
- No books
- No electronics

What to expect

- Exam Thursday December 12, 7:30am
  - You have 120 minutes to take the exam.

Midterm Topics

- Basic Geometry & Trigonometry
  - points, vectors, angles, cross products, etc.
- Segment/Segment Intersection
  - pairwise, AABB method, sweep method
- Polygons
  - Simple/non-simple, orientation, internal/external angles, diagonal definition, point inside polygon, number of triangulations, area, intersection by walking chains

Midterm Topics

- Art gallery problem
  - Max of mins definition, triangulation, dual of a triangulation, coloring of vertices
- Triangulation
  - Diagonal-based approach, ear-based approach, monotone partitioning, monotone triangulation

New Topics

- Convex Hulls
  - Definitions
  - Naïve Algorithms, QuickHull, Gift Wrapping, Graham Scan, Incremental, Divide-and-Conquer
- Voronoi Diagram
  - Definitions, Complexity of diagram
  - Naïve Algorithms, Incremental, Divide-and-Conquer
- Delaunay Triangulation
  - Definitions, relation to convex hull and Voronoi diagram

New Topics

- Searches
  - Grids, quadtress, kd-trees, binary space partition, bounding volume hierarchy
  - Nearest neighbor, K-Nearest neighbor, range search
- Clustering
  - K-means

Review Topics

- For all algorithms, study the algorithm themselves, time complexity (worst/best/average case), and worst/best case configurations