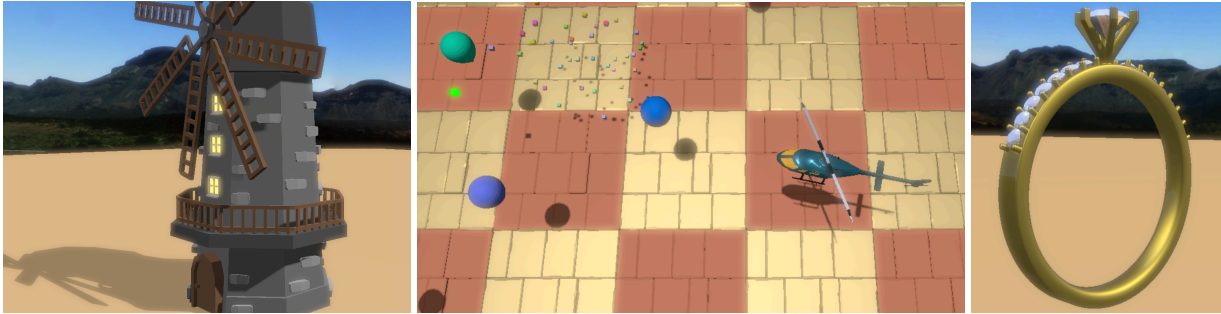# CSCI 8980-002: Real-time Game Engine Technology (3 Credits)

1:00 – 2:15 Monday, Wednesday
Keller Hall 1-254
Instructor: Stephen J. Guy

Course Description: The technology driving modern video games has brought forth new breakthroughs in real-time graphics, simulation, and artificial intelligence (AI), and has become increasingly common in wide range of entertainment, robotics, and virtual/augmented reality applications. In this course, we will cover the key algorithmic techniques that have enabled this revolution, investigate the trade-offs and limitations inherent in these real-time approaches, and discuss open problems and current trends in the field. Topics discussed will include real-time techniques for: physically-based lighting simulation, artificial intelligence (AI), sound simulation, character animation, and large-scale rendering.

Course Work: Students will participate in a combination of coding projects, student presentations, and class discussions. Coding projects will involve students writing their own real-time graphics, AI, and simulation code and integrate it into a broader framework. The course will take place in a computer lab, and substantial class time will be devoted to in-class programming. Classes are held in a computer lab, and course work will involve substantial in-class programming time with hands-on exploration of the course material. Additionally, students will be expected to present their projects to others in the class, and to provide substantial feedback and discussion of peer work.

Who should enroll: Students interested in real-time methods for computer simulation, interactive graphics, game programming, and AI.
Prerequisites: Experience in C++, data structures, using large code bases, and basic vector calculus (e.g., dot-products and gradients) is assumed. Previous experience in graphics programming helpful, but not strictly required.

Interested students should contact Stephen J. Guy (sjguy@umn.edu) with questions