

## CS Masters' Thesis Defense

**Title:** *3D Visualization of Conic Sections in XNA Game Programming Framework*  
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**Date:** Friday, September 16, 2011  
**Time:** 10:00 a.m.  
**Location:** GMCS 405  
**Thesis advisor:** Dr Kris Stewart

### **Abstract:**

The California State Department of Education (CSDE), who set the academic standards for all the schools in California, decided to incorporate the concepts of conic sections for all the students belonging to the grades from eight through twelve. Students are taught right down from the fundamentals of the conic sections and their relation to quadratic equations.

This thesis aims in helping high school students learn and understand the concepts of Conic sections by visually introducing them into learning a concept what is well defined in a 3 Dimensional space.

The creation of this 3D environment lead me to make use of the XNA game programming framework as both 2D and 3D design technology is bundled up as an overall package and hence, achieving various animations to show off different conic sections views could be obtained much more efficiently and effectively.

I have divided the teaching aspect of this project into 2 parts that tends to give a fine balance between learning, understanding and last but certainly not the least, user-interactivity. As part one, I have designed a set of pre-animated views of the conic sections describing the hyperbola, parabola, circle, ellipse, line and finally, a point. And as part two, in the free draw mode, the users have full flexibility in moving the 2D plane around and creating any shape desired. Along with this, I also provide an information button for each of the conic section screen that opens up a dialog box showing necessary information about the same such as, a figure, equations, textual info etc.

Overall, this project is aimed towards achieving a fun-filled, educational based gaming experience and is intended to act as an aid in teaching.

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