Scientific Computing with Visualization

What is this course about?

You will learn about some of the scientific computing methods and will get a chance to apply them with the most appropriate visualization techniques to solve problems in science, engineering, mathematics, and medicine.

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The plan

Scientific computing and visualization have been around for a while and often been seen as two separate fields. Each of these two fields desire dedicated attentions.

We will review some of the key concepts in scientific computing and will try to use them with visualization.

Naturally, some of the concepts are more visualization friendly than others. In fact, in some cases we may not learn much by applying visualization.

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What concepts in scientific computing

- Introduction
- Review of Basic Numerical Analysis Concepts, Linear Algebra, and Errors
- Visualization and Computational Tools
- Effect of Errors on Visualization Quality
- Application of Linear Algebra in Computing with Visualization
- Application of Monte Carlo Method in Computing with Visualization
- Investigating some Real World Scientific Problems

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My Expectations

Everyone who is taking the course must be able to solve a scientific problem with visualization in their respective field.

Some programming is required, and I am sure you will end up picking so much on your own.

This is a graduate level course and demands graduate level efforts and graduate quality of work.

Reading papers in the field and presenting on the ideas in a paper is important.

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What are your Expectations ?

What will we use?

The main programs we plan to use are:

- MATLAB (available in the computer labs across campus)

- ParaView (freeware, we will have it installed on lab machines in CAP)

- VolView (freeware, we will have it installed on lab machines in CAP)

- Programs are in C or MATLAB