Visualizing Mathematics

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Course 29

NOTES

SIGGRAPH 1995

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Los Angeles, California USA

Survey Form

Visualizing Mathematics

Put a check mark ☑ beside each course you've taken during your academic career. If you remember what grade you made, you can indicate that as well.

- ❑ Calculus
- ❑ Linear Algebra
- ❑ Topology
- ❑ Real Analysis
- ❑ Number Theory
- ❑ Advanced Calculus
- ❑ Group Theory
- ❑ Differential Geometry
- ❑ Graph Theory
- ❑ History of Mathematics

What's the hardest math course you took? What's the hardest thing about it?

_____

_____

What is some topic in mathematics that you wish you understood better?

_____

_____

Put a check mark by each talk that you attended.

- ❑ Design Ideas / *Blinn*
- ❑ Vis through Video / *Munzner*
- ❑ Visualization II / *Max*
- ❑ Vis on PC's / *Kim*
- ❑ Visualization I / *Max*
- ❑ 4D Graphics / *Banks*
- ❑ Vis through Software / *Munzner*
- ❑ Vis without Computers / *Kim*

(over) ☞

What is something you learned today as a result of attending this course?

What's an effective example of visualizing mathematics that wasn't discussed?

What software has helped you visualize mathematics?

What are some other references (books, articles, animations) or web pages that should be added to the lists at the end of these notes?

What is your name and electronic mail address (optional)?

Visualizing Mathematics

SIGGRAPH 1995
Tuesday, August 8
Los Angeles, California

My freshman year, the graphs of functions and their slopes demonstrated to my dad that this was some Serious Math his dollars were buying. Sophomore year, my four-pound thousand-page textbook had even more impressive figures of shaded surfaces whose areas I was obliged to calculate. My junior year, the figures were regressing to primitive hand-drawn blobs and the problems had no numbers ("Show that the rationals are not locally compact"). As a senior, I was a little nervous about letting Dad see my math book at all. There weren't *any* figures. Zero. I had to explain that this was a Good Thing.

I am happy that there are people who wish to illustrate and illuminate the abstract domain of mathematics, even at its advanced levels. Today you will see examples of mathematical ideas whose exposition benefits enormously from the generous use of computer graphics. The morning session is devoted to animations that shed light on geometry and topology: mathematical visualization is used as a tool for teaching. The focus of the afternoon session is on interactive systems: mathematical visualization is used as a tool for exploration.

I hope you enjoy the course and are stimulated by the presentation. Thank you for attending, and please take time to complete the survey on the preceding page.

-David Banks, *Course Chair*

Speakers

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Schedule

8:30 - 8:45	Welcome and Introduction *David Banks*
Morning Session:	**Using Film and Video to Communicate Mathematics**
8:45 - 10:00	Design Ideas for Mathematics Visualization *Jim Blinn*
10:00 - 10:15	*Morning Break*
10:15 - 11:15	Visualization in Geometry and Topology, Part 1 *Nelson Max*
11:15 - 12:00	Mathematical Visualization through Video *Tamara Munzner*
12:00 - 1:30	*Lunch*
Afternoon Session:	**Using Film and Video to Communicate Mathematics**
1:30 - 2:30	Interactive 4D Graphics *David Banks*
2:30 - 2:50	Visualization in Geometry and Topology, Part 2 *Nelson Max*
2:50 - 3:30	Mathematical Visualization through Interactive Software *Tamara Munzner*
3:30 - 3:45	*Break*
3:45 - 4:20	Mathematical Visualization on Personal Computers *Scott Kim*
4:20 - 5:00	Mathematical Visualization without Computers: Trends in Education *Scott Kim*

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