

# Information Visualization

Lecture 1 CPSC 533C, Fall 2004

13 September 2004

Tamara Munzner

## Outline

My History

Course Structure

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## The Geometry Center

1991–1995 Technical Staff

The National Science and Technology Center for  
Computation and Visualization of Geometric  
Structures

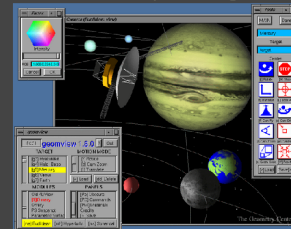
mathematical (geometry and topology)  
visualization

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## GC: General-purpose visualization

Geomview

- very flexible, several thousand users in many domains
- supports noneuclidean spaces, higher dimensions



[www.geom.umn.edu/software/geomview](http://www.geom.umn.edu/software/geomview) 1993–2000  
[www.geomview.org](http://www.geomview.org) 2000–

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## GC: Visualization videos

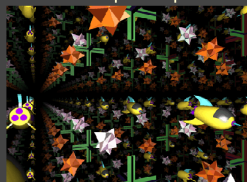
explain advanced topology to general audience

Outside In



[Silvio Levy, Delle Maxwell, and Tamara Munzner, Outside In (Video, 22 minutes). AK Peters, 1994.]

The Shape of Space



[Tamara Munzner and Delle Maxwell, The Shape of Space (Video, 13 minutes). Key Curriculum Press, 2000.]

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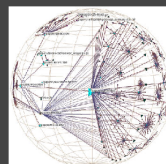
## Thesis: Interactive Navigation of Large Graphs and Networks

1995–2000 PhD Stanford

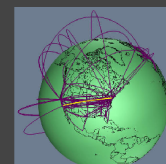
H3

Planet Multicast

Constellation



[Munzner 1997, 1998a, 1998b]



[Munzner, Hoffman, Clafly, and Fenner 1996]



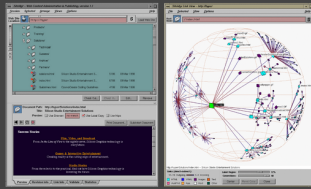
[Munzner, Guimbretiere, and Robertson 1999] Microsoft Research

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## SGI: Site Manager

web site content management tool

- H3 view of site hyperlink structure
- shipped from Irix 6.2 on



[[www.sgi.com/software/sitemgr.html](http://www.sgi.com/software/sitemgr.html)]

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## Compaq Systems Research Center

2000–2002, Research Scientist

TreeJuxtaposer

- visual comparison of large evolutionary trees



[Munzner, Guimbretiere, Zhang, Tasiran, and Zhou 2003]  
[Slack, Munzner 2003]

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## Current Infovis Research

domains

- evolutionary trees
- genomic sequences
- transaction logs
- environmental sustainability
- power grid control
- computer security

techniques

- accordion drawing
- multidimensional scaling
- scalable graph drawing

InfoVis Symposium organization

- Program Co-Chair 2003, 2004
- Posters Co-Chair 2001, 2002

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## Course Structure

first part

- professor lectures
- all do core readings

second part

- student presentations
- presenter does topic readings

requirements

- project: 50%
- presentation: 25%
- small assignment: 5%
- class participation: 20%

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## Projects

choice 1: programming

- like last year
- I will only consider supervising students who do programming projects

choice 2: analysis

- use existing tools on dataset
- detailed domain survey
- suitable for non-CS students

stages

- meeting with me in person
- proposal Nov 5
- update presentations Nov 17,22
- final report/present Dec 15

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## Presentations

second half of class

sign up by Oct 19

material

- 2 papers from my suggestions
- 1 paper found on your own

talk

- slides required
- critical points of papers
- comparison and critique
- not just outline!

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## Participation

- 10%: discussions in class
  - both lectures and student presentations
- 10%: 5 questions on required readings
  - due at beginning of class
  - if you can't attend: email required \*before\* class

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## Required Books

- Ware
  - Information Visualization: Perception for Design
    - 2nd edition
- Tufte
  - Envisioning Information

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## Reserve Books

- Information Visualization: Perception for Design, Colin Ware
- The Visual Display of Quantitative Information, Edward R. Tufte, Graphics Press 1983
- Envisioning Information, Edward R. Tufte, Graphics Press 1990
- Visual Explanations, Edward R. Tufte, Graphics Press 1997
- Readings in Information Visualization: Using Vision To Think; Card, Mackinlay, and Shneiderman, eds; Morgan Kaufmann 1999.
- The Visualization Toolkit, 2nd edition; Schroeder, Martin and Lorensen; Prentice Hall 1998

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## Assignment 1

- find and critique two images
  - one good visualization
  - one bad visualization
- make web page, send me URL by noon Wed
  - pictures, two paragraphs for each
  - first par: story
  - second par: specific critique
    - accessability
    - clarity
    - accuracy
    - other important design criteria
- be prepared to discuss for 3–4 minutes in class

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## Assignment 1

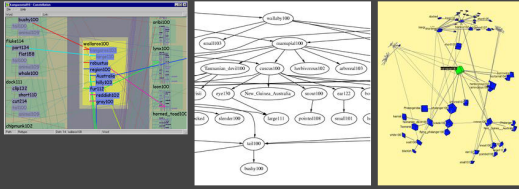
- sources
  - textbook
  - journal
    - Journal of Applied Optics, ...
  - science magazine
    - Nature, Science, Scientific American, ...
  - news magazine or newspaper
    - Newsweek, Economist, NY Times, USA Today, ...
- domains
  - mathematics
  - physical sciences
    - astronomy, physics, chemistry, ...
  - biological sciences
    - ecology, medicine, bioinformatics, ...
  - social sciences
    - economics, crime statistics, ...

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## Lecture Topics

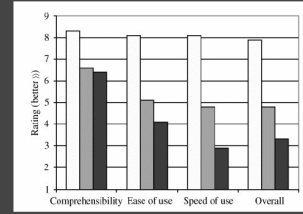
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# Design Studies

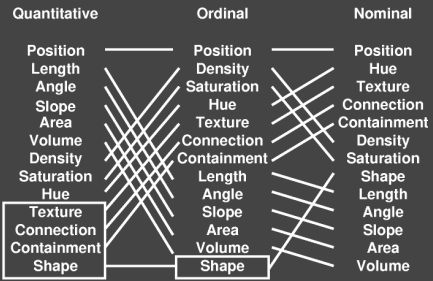


# Evaluation

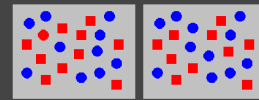
Guest Lecturer: Melanie Tory



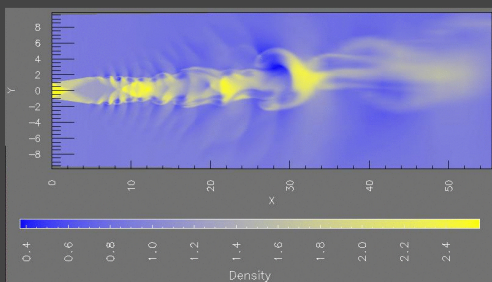
# Frameworks/Models



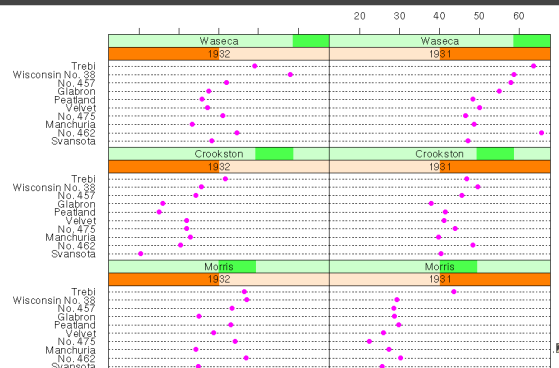
# Perception



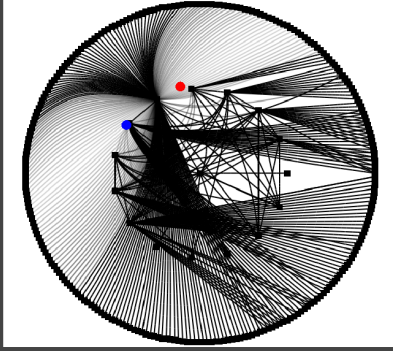
# Color



# Space/Order

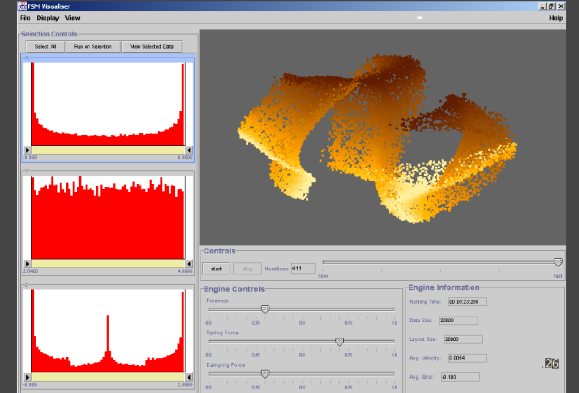


## Depth/Occlusion

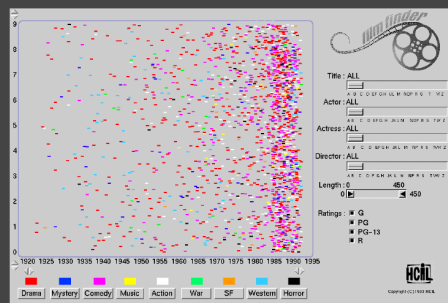


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## High Dimensionality

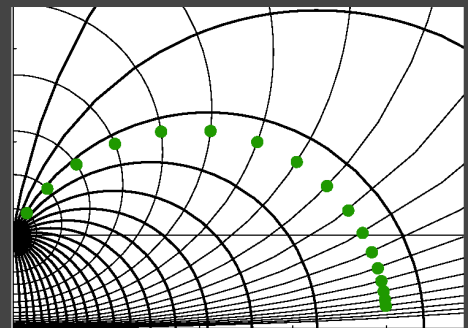


## Interaction



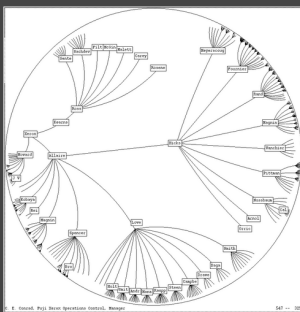
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## Navigation/Zooming



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## Focus+Context



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## Graphs/Trees



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## Scientific Visualization

Guest Lecturer: Melanie Tory

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## Course Home Page

permanent URL

· [www.cs.ubc.ca/~tmm/courses/cpsc533c-04-fall](http://www.cs.ubc.ca/~tmm/courses/cpsc533c-04-fall)

shortcut

· [www.cs.ubc.ca/~tmm/courses/533](http://www.cs.ubc.ca/~tmm/courses/533)

reload frequently, updates common!