

# Information Visualization

## Lecture 1 CPSC 533C, Spring 2004

12 Jan 2003

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

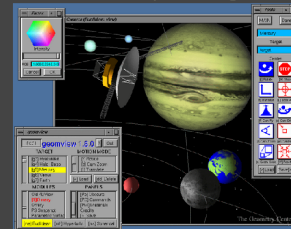
mathematical (geometry and topology)  
visualization

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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

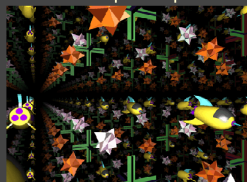
explain advanced topology to general audience

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

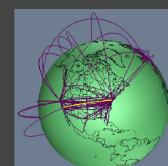
1995–2000 PhD Stanford

H3



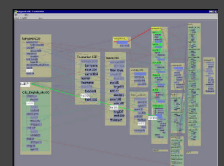
[Munzner 1997, 1998a, 1998b]

Planet Multicast



[Munzner, Hoffman, Clafly, and Fenner 1996]

Constellation



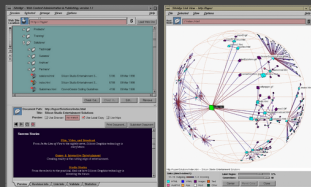
[Munzner, Guimbretiere, and Robertson 1999] Microsoft Research

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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)]

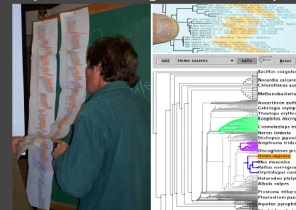
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## Compaq Systems Research Center

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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## Research area: infovis

scalability to large datasets

fluid navigation

InfoVis Symposium organization

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

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## Course Home Page

permanent URL

<http://www.cs.ubc.ca/~tmm/courses/cpsc533c-04-spr>

shortcut

<http://www.cs.ubc.ca/~tmm/courses/533>

reload frequently, updates common!

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## Course Structure

first part

- professor lectures
- all do core readings

second part

- student presentations
- presenter does topic readings

requirements

- presentation
- small assignments
- project
- class participation

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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 Mar 1
- update presentations Mar 15–17
- final report/present Apr 21

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## Topic Presentations

second half of class

later: topics + readings posted, signup

material

- 3 papers from my suggestions
- 2 papers found on your own

talk

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

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## Required Books

Ware

Information Visualization: Perception for Design

- 7 copies this week at bookstore
- more later in Jan, or Amazon

Tufte

Envisioning Information

- later in Jan, or Amazon
- first reading due Jan 28

Lewis and Reiman

Task-Centered User Interface Design

- online book
- only required if no HCI course

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## Reserve Books

Information Visualization: Perception for Design, Colin Ware

- as soon as it is returned

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 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

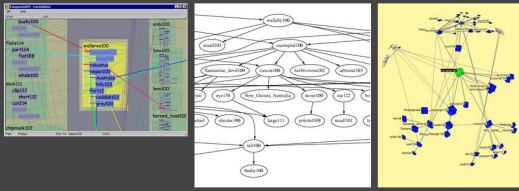
- mathematics
- physical sciences
  - astronomy, physics, chemistry, ...
- biological sciences
  - ecology, medicine, bioinformatics, ...
- social sciences
  - economics, crime statistics, ...

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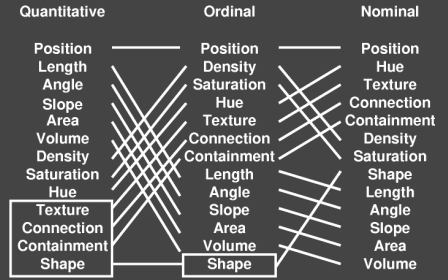
## Lecture Topics

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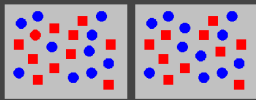
# Design Studies



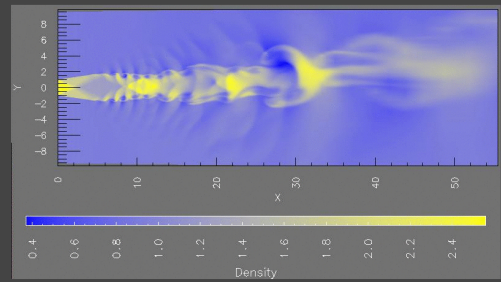
# Frameworks/Models



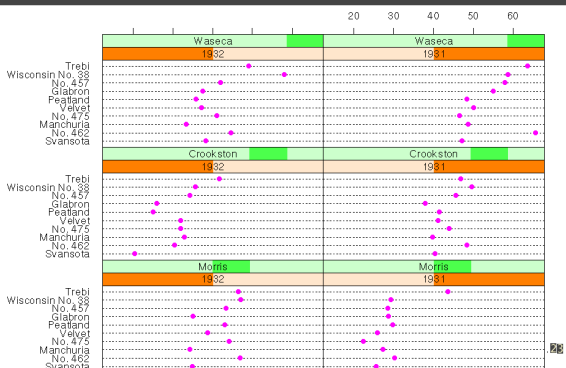
# Perception



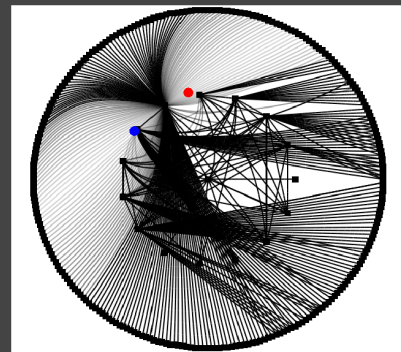
# Color



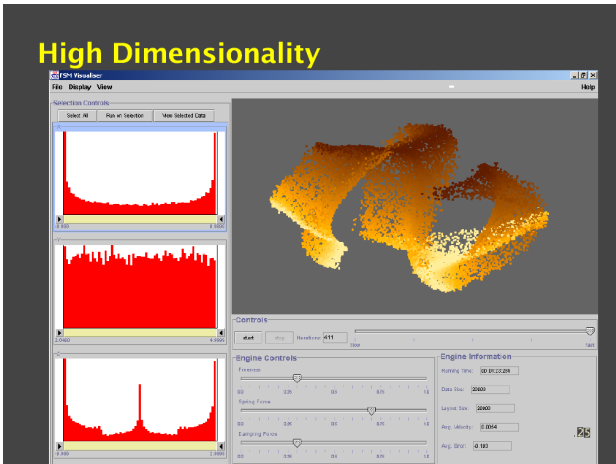
# Space/Order



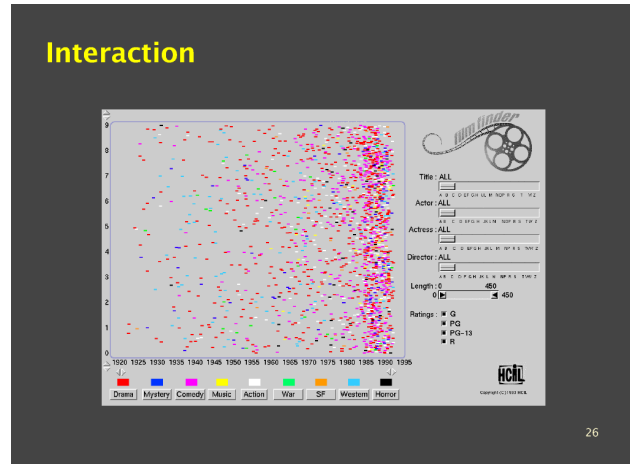
# Depth/Occlusion



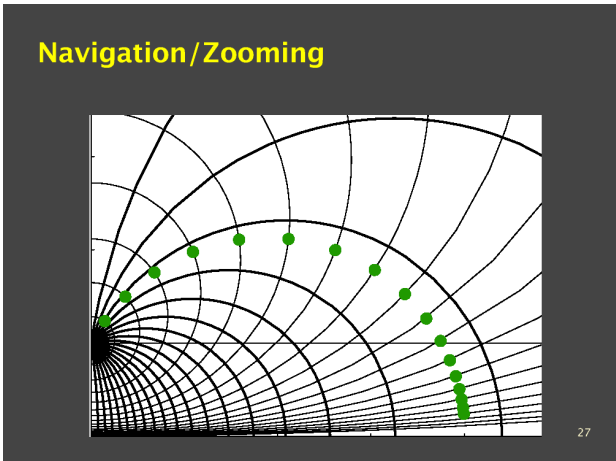
## High Dimensionality



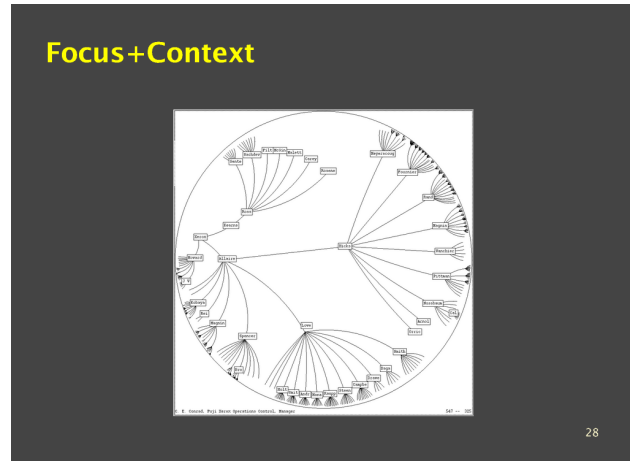
## Interaction



## Navigation/Zooming



## Focus+Context



## Graphs/Trees



## Scalability, Evaluation

