

## INFO 424: Information Visualization & Aesthetics

Maureen Stone and Polle Zellweger  
Guest Lecturers

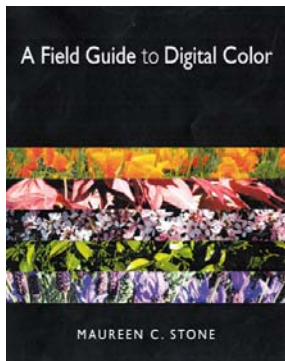
## Introduction

- ◆ About us
- ◆ About you
- ◆ About the course
- ◆ About information visualization

## About Us

## Maureen Stone

- ◆ BS & MS from U.of Illinois; MS from Caltech
- ◆ 20 years at Xerox PARC
  - ❖ Illustration and design systems
  - ❖ Color management and selection systems
  - ❖ User interfaces, interactive computer graphics, experimental design, and more...
- ◆ StoneSoup Consulting since 1998
- ◆ Adjunct professor SFU/SIAT since June 2006



Color Vision  
Color Appearance  
RGB and Brightness  
Color in Nature  
Overview  
Image capture and encoding  
Additive Color  
Subtractive Color  
Managing Digital Color  
Color in Computer Graphics  
Color design and selection  
Color in Information Display

## Current Work

- ◆ Color encoding and UI design (Tableau, MS)
- ◆ “Subtle Visualization” (SFU/SIAT)
- ◆ Color in Information Display
  - ❖ Articles and tutorials
  - ❖ SIGGRAPH, IEEE Vis conferences
  - ❖ University courses: UW, UBC, Stanford
- ◆ Flash animation to 8<sup>th</sup> graders
- ◆ EIC of IEEE Computer Graphics & Applications

## Polle Zellweger

- ◆ PhD Computer Science, UC Berkeley
  - ❖ “Interactive Source-Level Debugging of Optimized Programs”
- ◆ 20 years at Xerox PARC
  - ❖ multimedia, hypertext, eBooks, UI design
  - ❖ Fluid Documents
    - animated typography, annotations in context
  - ❖ information organization & visualization
- ◆ 1 year Visiting Professor at U of Aarhus, Denmark
  - ❖ taught User Interfaces for Mobile Devices

## Fluid Links

- ◆ **Problem:** Choosing whether to follow links
- ◆ Fluid Links help users
  - ❖ get a preview of the destination while still in the source context
  - ❖ manage when to follow a link

### KING MAKES IT THREE

By Doug O'Harra and Craig Medred  
NOME, AK -- Wednesday, March 18, 1998

Pounded by fierce coastal winds, Jeff King of Denali Park saw his chance for a record Iditarod Trail Sled Dog Race blow away on Tuesday, but his team persevered to claim a third victory in 9 days, 5 hours, and 52 minutes. Only miles away from the Nome finish line, King and his dogs were caught in a ground blizzard that cut visibility to almost nothing. He later said the weather was the worst he'd witnessed in six Iditarod races.

### KING MAKES IT THREE

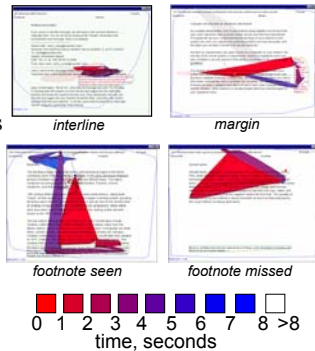
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Pounded by fierce coastal winds, Jeff King of Denali Park saw his chance for a record Iditarod Trail Sled Dog Race blow away on Tuesday, but his team persevered to claim a third victory in 9 days, 5 hours, and 52 minutes. **Compare with Doug Springy's record set in 1996: 2 days, 2 hours, and 4 minutes.** Only miles away from the Nome finish line, King and his dogs were caught in a ground blizzard that cut visibility to almost nothing. He later said the weather was the worst he'd witnessed in six Iditarod races.

Zellweger, Chang, Mackinlay. Fluid Links for informed and incremental link transitions. *Hypertext '98*.

## Fluid Links Study: Eye Movement Visualization

- ◆ Static visualization shows eye movement from the time the gloss begins to open
- ◆ Helped us code thousands of gloss events quickly



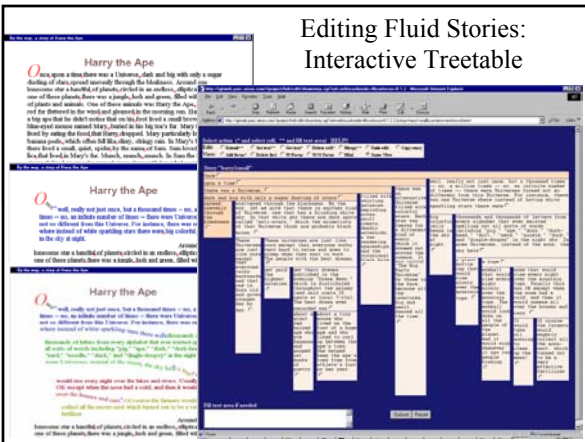
## The Fluid Reader

- ◆ **Problem:** Making sense of hypertext narratives
- ◆ The Fluid Reader
  - ❖ provides continuously-visible context
  - ❖ supports fine-grained hypertexts
  - ❖ uses interactive animation to adjust content



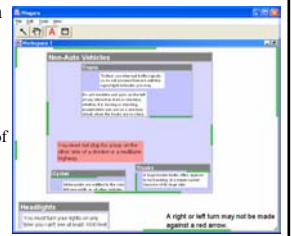
Zellweger, Mangen, Newman. Reading and writing Fluid hypertext narratives. *Hypertext 2002*.

## Editing Fluid Stories: Interactive Treetable



## Niagara Spatial Organizer: CityLights Awareness Visualizations

- ◆ **Problem:** Allow users to “stay in the flow” of organizing and creating information
- ◆ Niagara helps users
  - ❖ handle positioning and awareness of spatial objects
- ◆ Green CityLights bars show presence & direction of unseen objects



Zellweger, Mackinlay, Good, Stefik, Baudisch. City Lights: contextual views in minimal space. *CHI 2003*.

Marilyn Ostergren

Who are you?  
Why are you here?

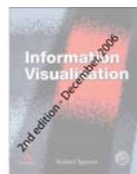
About the Course

### Class Times & Attendance

- ◆ Lecture TTh 1:00-2:20p MGH 234
- ◆ Lab F 1:30-3:20p MGH 430
  
- ◆ 3 lecture hours, 2 lab hours
- ◆ ~10 outside hours
  
- ◆ Attendance in both lectures and labs is expected

### Course Texts

- ◆ Edward Tufte  
*Envisioning Information*  
Graphics Press, 1990
  - ❖ Purchase this book
  
- ◆ Robert Spence  
*Information Visualization*  
2<sup>nd</sup> edition, December 2006
  - ❖ Draft available online to INFO 424 students



### Course Outline

Sep 27-29	Introduction
Oct 2-6	Perspectives on InfoVis
Oct 9-13	Information Graphics
Oct 16-20	Visual Communication & Models
Oct 23-27	Users, Design & Evaluation
Oct 30-Nov 3	Connectivity
Nov 6-10	Layering, Color & Perception
Nov 13-17	Interactive Visualization
Nov 20-24	Text & Documents
Nov 28-Dec 1	Project Presentations
Dec 4-8	Future Directions

## Assignments & Grading

- ◆ Weekly reading responses 25%
- ◆ Weekly lab write-ups 20%
- ◆ Class spirit and participation 5%
  
- ◆ Two visualization critiques 15%
- ◆ Final project 35%

## Visualization Critiques

- ◆ Find good and bad examples of visualizations
  - ❖ analyze and put on a web page
  - ❖ details on course website
- ◆ Critique 1: static visualizations
  - ❖ due October 5
- ◆ Critique 2: dynamic visualizations
  - ❖ due October 19
- ◆ Ongoing?

## Final Project

- ◆ Develop & evaluate a system for information visualization
  - ❖ group of 3-4 students
  - ❖ problem of your choice
  - ❖ verbal presentation to class
  - ❖ written report due December 7
  - ❖ further details on course website

## Contact Info

- ◆ Maureen Stone [mcstone@u.washington.edu](mailto:mcstone@u.washington.edu)
- ◆ Polle Zellweger [pollez@u.washington.edu](mailto:pollez@u.washington.edu)
  - ❖ Office hours: T Th 11:15-12:00 MGH 330K
- ◆ TA: Marilyn Ostergren [ostergm@u.washington.edu](mailto:ostergm@u.washington.edu)
  - ❖ Office hours: T 3:00-4:00 MGH 416
- ◆ Course website: <http://courses.washington.edu/info424/>

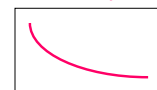
## About Information Visualization

### Problem: Information Overload



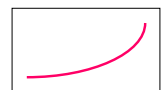
- ◆ Ray Kurzweil: “The Age of Spiritual Machines”

Entropy



Heat death of the universe

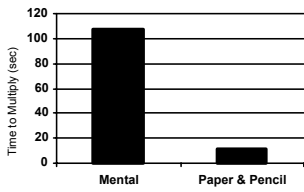
Information



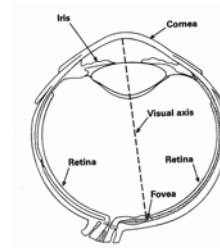
Explosion of knowledge

### Strategy: Use External World

$$\begin{array}{r} \phantom{0}^2 34 \\ \times 72 \\ \hline \phantom{0} 68 \\ \phantom{0} 2380 \\ \hline \phantom{0} 2448 \end{array}$$



### Exploit Human Perception



### How Many Zeros in 100 Digits of PI?

3.1 4 1 5 9 2 6 5 3 5 8 9 7 9  
 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7  
 9 5 0 2 8 8 4 1 9 7 1 6 9 3 9  
 9 3 7 5 1 0 5 8 2 0 9 7 4 9 4  
 4 5 9 2 3 0 7 8 1 6 4 0 6 2 8  
 6 2 0 8 9 9 8 6 2 8 0 3 4 8 2  
 5 3 4 2 1 1 7 0 6 7 9 8 2 1 4

### How Many Red Objects?

3.1 4 1 5 9 2 6 5 3 5 8 9 7 9  
 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7  
 9 5 0 2 8 8 4 1 9 7 1 6 9 3 9  
 9 3 7 5 1 0 5 8 2 0 9 7 4 9 4  
 4 5 9 2 3 0 7 8 1 6 4 0 6 2 8  
 6 2 0 8 9 9 8 6 2 8 0 3 4 8 2  
 5 3 4 2 1 1 7 0 6 7 9 8 2 1 4

### Visualize



- ◆ To make visible
- ◆ To see or form a mental image of