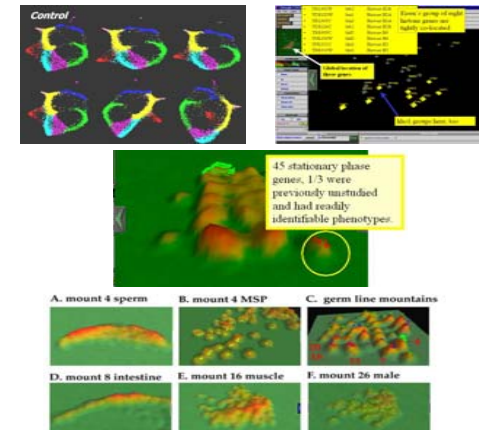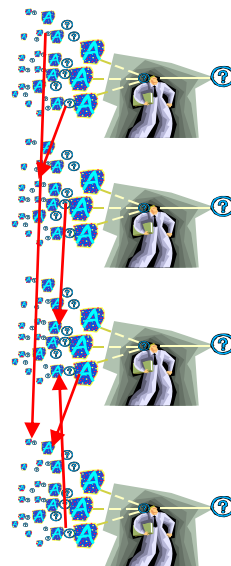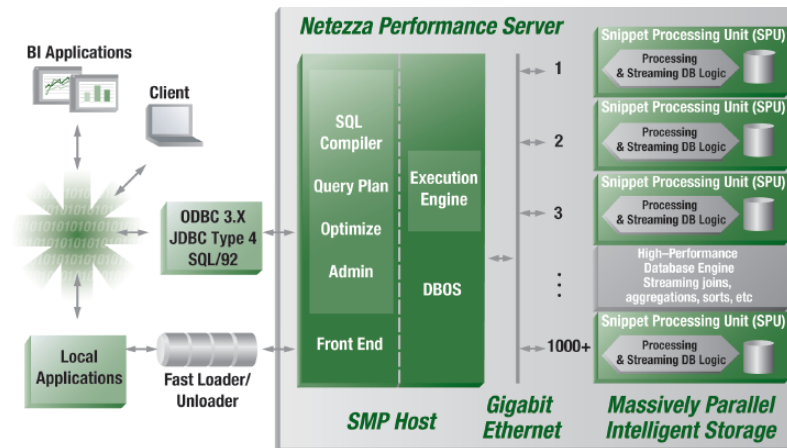# Data Centric Computing: Bio/Biomedical Problem Solving Environments

George Davidson

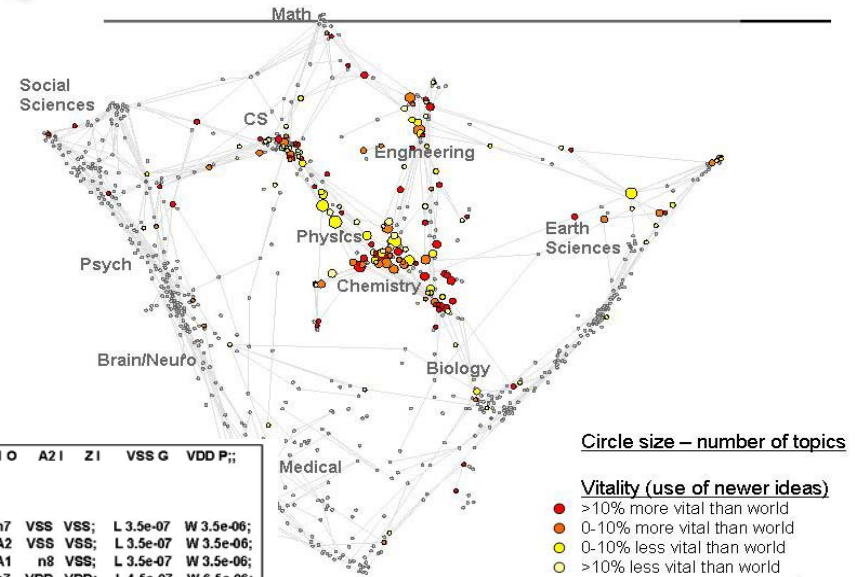Sandia National Laboratories

Overview

- Netezza evaluation

- My typical mp computations

- What I really want/need in order to be more productive.

Netezza Massively Parallel Database Machine

- Bib coupling: map of science

- Netlist / graph search

- Word sense disambiguation: "*bush gave rice the book*"

Sandia Profile

Math

Social Sciences

CS

Engineering

Physics

Earth Sciences

Psych

Chemistry

Brain/Neuro

Biology

Medical

Circle size – number of topics

Vitality (use of newer ideas)
- >10% more vital than world
- 0-10% more vital than world
- 0-10% less vital than world
- >10% less vital than world

```
c and2d1 Cell A1 O    A2 I    Z I     VSS G   VDD P;;
* 5 pins
* 7 nets
* 6 instances
i M1 N   Z   n7  VSS  VSS;    L 3.5e-07   W 3.5e-06;
i M2 N   n8  A2  VSS  VSS;    L 3.5e-07   W 3.5e-06;
i M3 N   n7  A1      n8  VSS;    L 3.5e-07   W 3.5e-06;
i M4 P   Z   n7  VDD  VDD;    L 4.5e-07   W 6.5e-06;
i M5 P   n7  A2  VDD  VDD;    L 4.5e-07   W 6.5e-06;
i M6 P   n7  A1  VDD  VDD;    L 4.5e-07   W 6.5e-06;
e
```
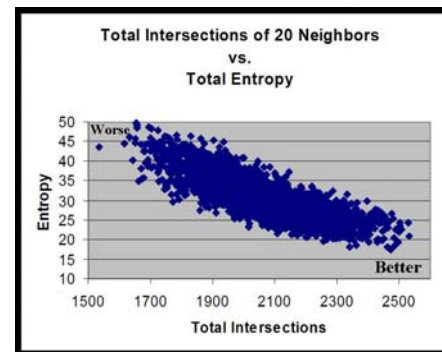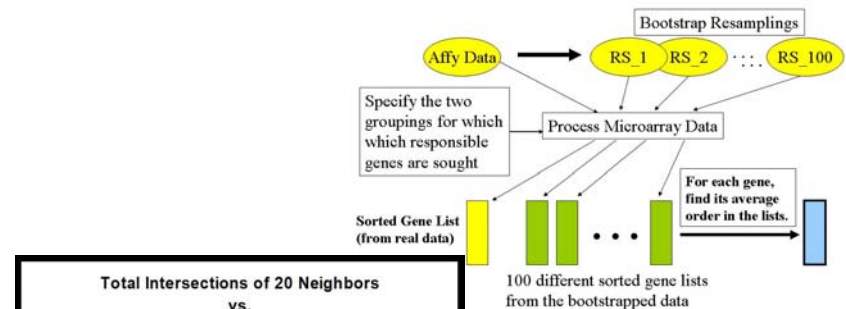
M5

M6   M4

A1

M3   n7   M1

n8

M2

A2
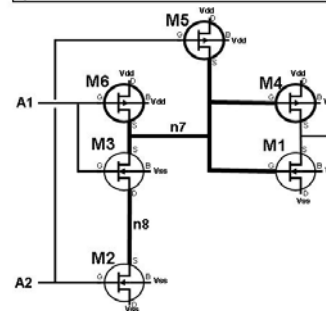
Better translations

Better query results

Massively Serial Computations

- Bootstraps
- Stable clusters
- Gene lists
- Network stability

Total Intersections of 20 Neighbors vs. Total Entropy

Bootstrap Resamplings

What is going on in S1 & S2 ?
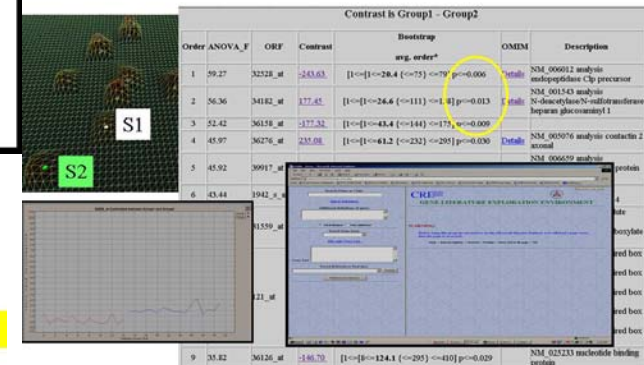
In 1000 networks, 13 of 81 nodes always include the same clauses

Strong equations in exit from alpha arrest and around cell cycle check-points

Fraction of 1000 networks with one or more clauses the same

Nodes with clauses appearing in more than 20% of the networks are shown, and highlighted in the network
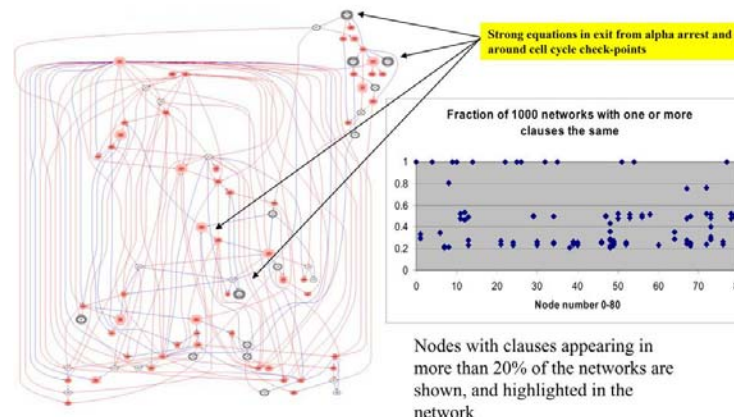
The grand problem in biology

- Reading, reading, reading and more reading.

- Memory, memory, and more memory (managing the overwhelming number of details).

- Knowledge management for individuals and teams across space and time (world wide, and for decades).

Managing reading and knowledge within a research team

- Managing and sharing annotations from individual team members

- Linking primary sources with detailed databases

- Linking primary sources with what we believe is true (interactive sketches).
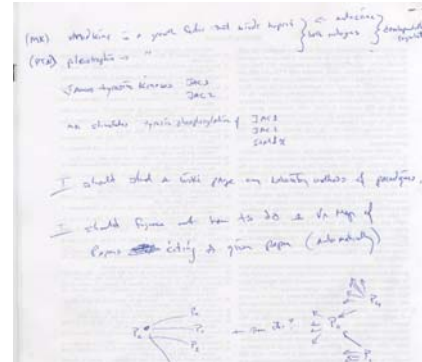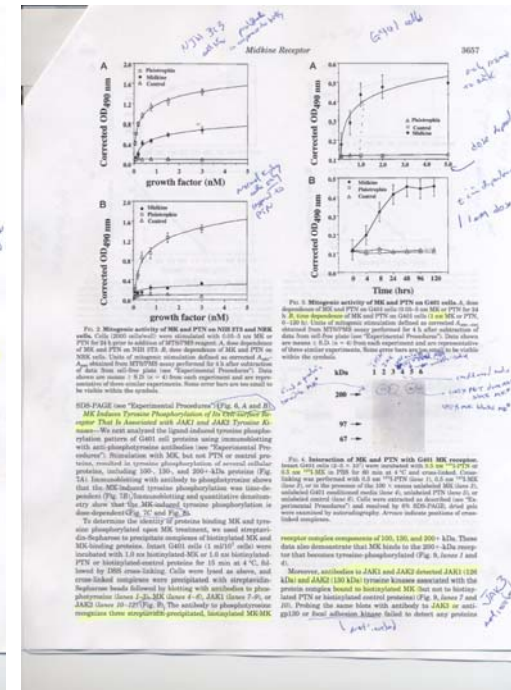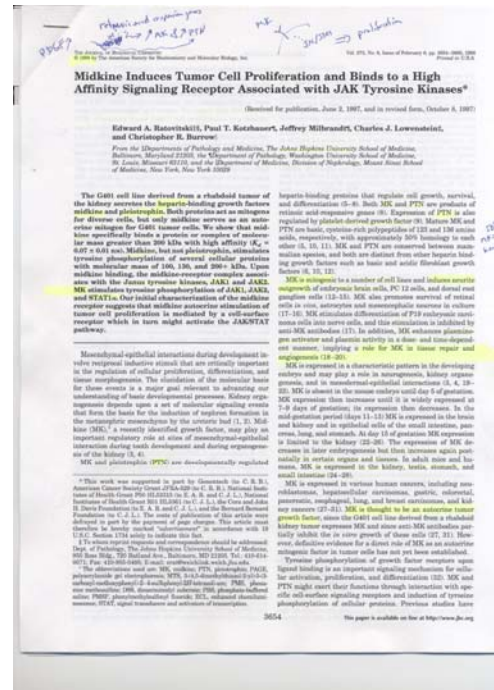
Prototyping the environment

- All of your favorite tools
- Annotations, automatic and human
- Linking everything together through modifiable web pages (wiki)
- Capturing and updating drawings and visual metaphors about what is known (believed, at least).

Massively-multiplayer problem solving environments

MelbourneDAC2003

'This Is Not a Game': Immersive Aesthetics and Collective Play

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ABSTRACT:
The increasing convergence and mobility of digital network technologies have given rise to new, massively-scaled modes of social interaction where the physical and virtual worlds meet. This paper explores one product of these extreme networks, the emergent genre of immersive enter-tainment, as a potential tool for harnessing collective action. Through an analysis of the structure and rhetoric of immersive games, I explore how immersive aesthetics can generate a new sense of social agency in game players, and how collaborative play techniques can instruct real-world problem-solving.

KEYWORDS
massively-multiplayer gaming, virtual reality, collective intelligence, extreme networks

Is Data-centric Computing some sort of
Problem Solving Environment for a world of minds?
(If so, what are the implications for architecture?)

Or as the boy tells Neo,
"*Do not try and bend the spoon [build perfect computers].
That's impossible.
Instead, only try to realize the truth*."

- "The network is the computer", Scott McNealy

- The global chat room is the computer.

- We are the computer

- "There is no spoon [computer] … it is not the spoon that bends, it is only yourself."