

Looking Around,  
not just straight ahead,  
to 'see' a possible future of  
graduate school education



Be Aware of Tunnel Vision!

Presentation at annual meeting of the Council of Graduate Schools - Dec 5<sup>th</sup>, 2009

# Opportunities/Challenges – from at least one point of view

- in the Science
- meeting the cost of specialized seminars
- new forms of the public intellectual
- in the humanities– new literacies
- re-inventing the land grant university for 21<sup>st</sup> C.
- stepping back

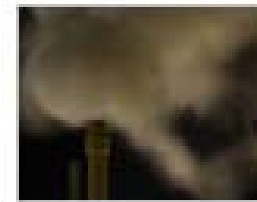
# National Academy of Engineering Grand Challenges



Make solar energy economical



Provide energy from fusion



Develop carbon sequestration methods



Manage the nitrogen cycle



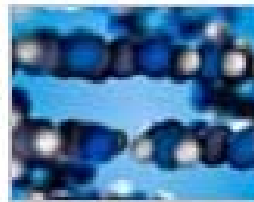
Provide access to clean water



Restore and improve urban infrastructure



Advance health informatics



Engineer better medicines



Reverse-engineer the brain



Prevent nuclear terror



Secure cyberspace



Enhance virtual reality



Advance personalized learning



Engineer the tools of scientific discovery

Provide access to clean water  
Restore and improve urban infrastructure  
Advance health informatics

Each of these challenges requires a  
socio-technical, interdisciplinary  
approach.

Are we preparing our student of such?  
Are IGERT's enough?

Manage the nitrogen cycle

Advance personalized learning  
Engineer the tools of scientific discovery

As Nobel laureate and U.S. Secretary of Energy  
Steven Chu has remarked,

“We seek solutions. We don’t seek—  
dare I say this?—just scientific papers anymore”

Going to the root of the problem  
creates boundary objects around which  
deep cross disciplinary work can take place.  
<math, physics, computation, anthropology, psychology>



A key to our radical innovations  
at Xerox PARC

“Tomorrow’s discoveries will depend less on our capacity to manage the biggest accelerator, the largest research center, or the fastest computer, and more on our ability to create fluid, responsive networks of scientists and engineers.”

Diana Rhoten

NSF – cyber infrastructure office

The Dawn of Networked Science,  
The Chronicle of Higher Education

Preparing for the data tsunami

data, data, every where  
but can I makes sense of it all?

## *Moore's Law Cubed*

The size of data bases are now exploding,  
way outpacing Moore's law!

In 6 years: the size of databases have grown by  
a factor of 1000  
while capability of CPUss have only grown by  
a factor of 10

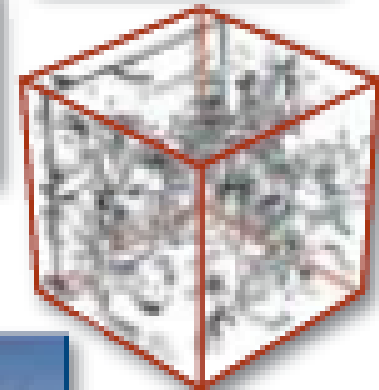


# Science Paradigms

- Thousand years ago:  
science was **empirical**  
*describing natural phenomena*
- Last few hundred years:  
**theoretical** branch  
*using models, generalizations*
- Last few decades:  
**a computational** branch  
*simulating complex phenomena*
- Today: **data exploration** (eScience)  
*unify theory, experiment, and simulation*
  - Data captured by instruments  
or generated by simulator
  - Processed by software
  - Information/knowledge stored in computer
  - Scientist analyzes database/files  
using data management and statistics

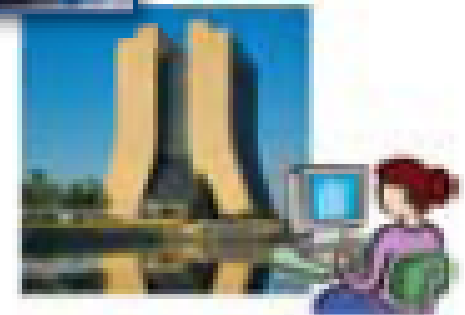


$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - K\frac{c^2}{a^2}$$



Are we preparing our science students/faculty  
for this 4<sup>th</sup> paradigm of science?  
And likewise for our students in  
computer, information & library sciences.  
The challenges are immense.  
We need new ways of thinking and doing.

- Today: **data exploration (eScience)**  
*unify theory, experiment, and simulation*
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# The Long Tail in Education



80% of the cost comes from servicing  
the 'thin' part long tail  
i.e.; extremely niche courses/seminars

Let's look at the long thin part of the tail.

# Advanced Italian Literature Seminar

New kind of learning/scholarship platform:  
a highly specialized open, scholar's portal

New forms of peer review – a view into a practice

DECAMERON  
WEB

A GROWING HYPERMEDIA ARCHIVE OF MATERIALS  
DEDICATED TO BOCCACCIO'S MASTERPIECE

BOCCACCIO      HISTORY  
TEXTS            SOCIETY  
SEARCH          RELIGION  
BRIGATA        ARTS  
PLAGUE          MAPS  
LITERATURE     THEMES/MOTIFS  
BIBLIOGRAPHY

NEW   GUESTBOOK   THE PROJECT   LISTSERV   PEDAGOGY   SYLLABUS   LINKS

Brown Univ.

# The Long Tail in Education



Are we collaborating across institutions?

Do we use cyber infrastructure for distributed learning, inquiry and exploration -- expanding scope while saving costs by sharing resources and expertise?

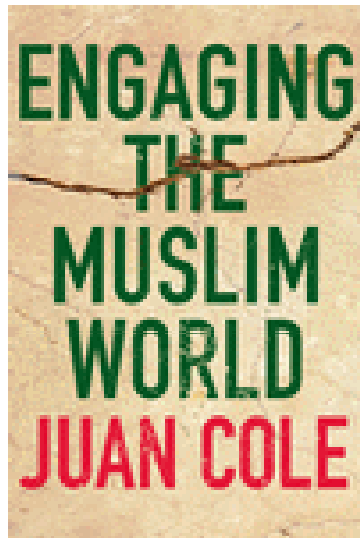
# Blogging

- might professors that blog be useful?
- might blogs count for something in tenure cases? (or even hurt??)
- might there be a use for grad student blogging?



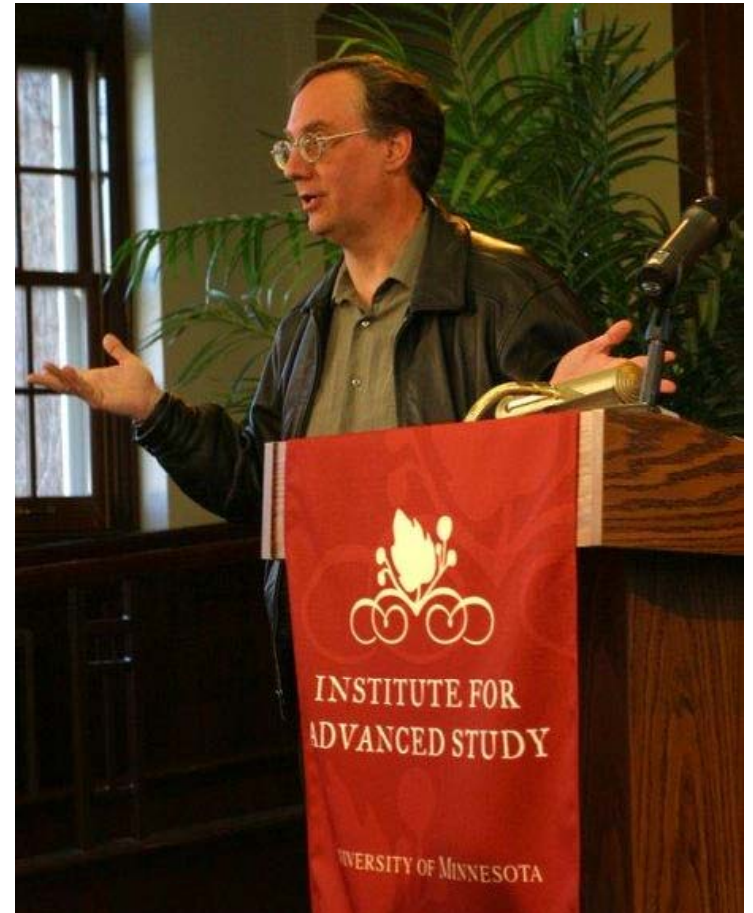
What?? I thought blogging was just a narcissistic pastime?

# Juan Cole – Scholar and Blogger University of Michigan.



## **Informed Comment**

Thoughts on the Middle East, History, and Religion



[Clean Energy](#)

### Site details

<http://www.juancole.com>



**Technorati Authority: 645**

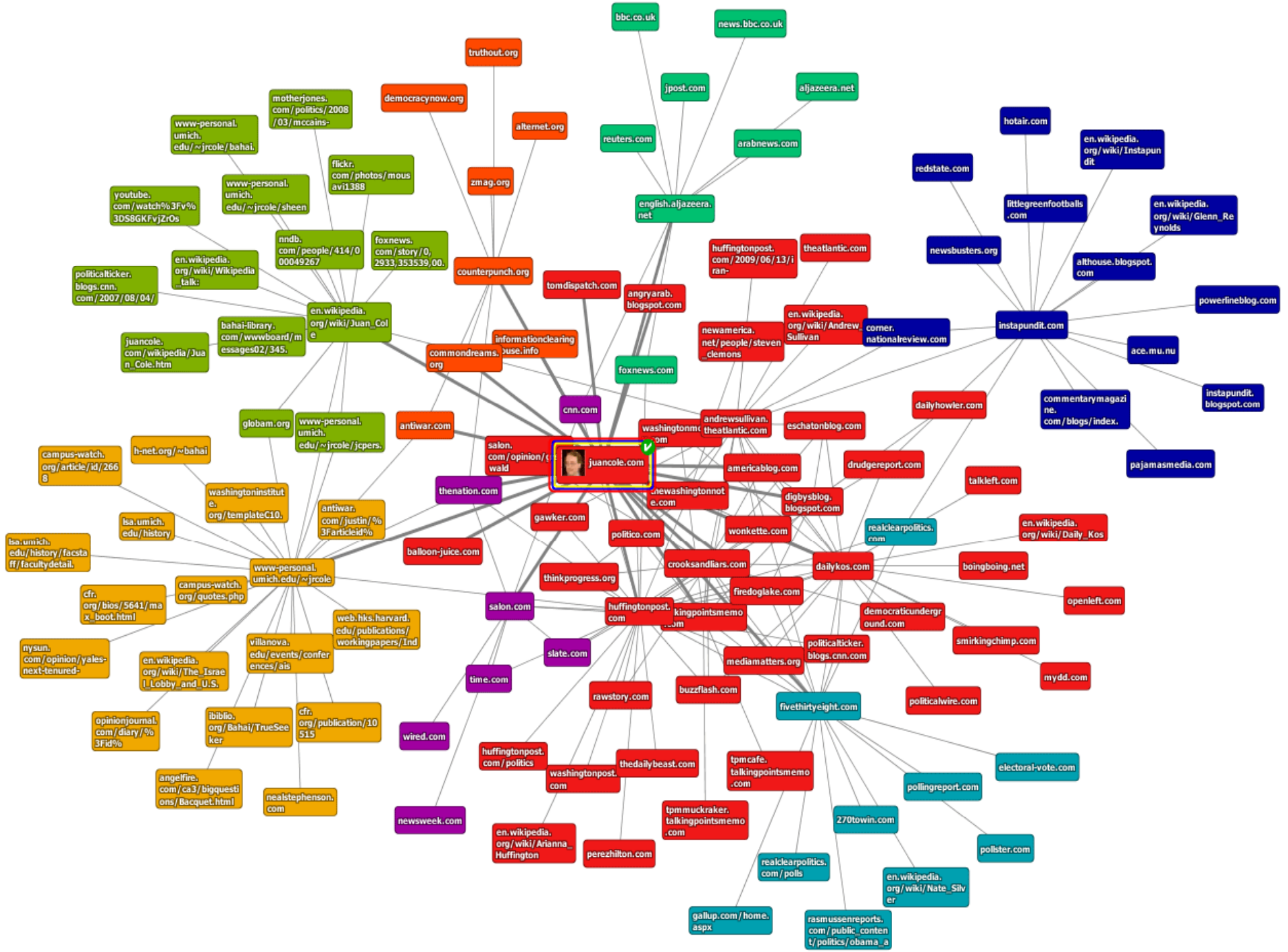
Middle East, foreign affairs, religion, Islam and history are discussed by a professional historian.

TOP 100 POLITICS

TOP 100 US POLITICS

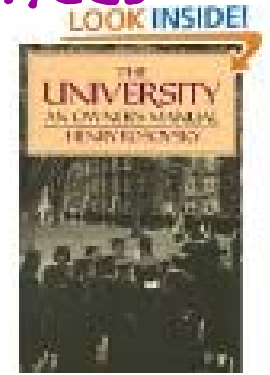
TOP 100 WORLD POLITICS







Henry Rosovsky – former Dean  
of the Faculty of Arts and Sciences  
Harvard University.



(and daily blog reader)

"Shots in the Dark," by Richard Bradley

"The Spine," by Martin Peretz

"Insidehighered" ...daily analysis in considerable depth.

"Saving Alma Mater" by James C. Garland, a former public university president. Focuses on the plight of public institutions.

### + Program Info

For full course descriptions and general information, please visit the Interactive Media Division on the SCA website.

#### Master of Fine Arts

The M.F.A. in Interactive Media is a three-year intensive program stressing creativity of expression, experimentation and excellence in execution of in the emerging field of interactive entertainment.

#### Bachelor of Arts

The B.A. in Interactive Entertainment combines a broad liberal arts background with a specialization in game design & development, interactive media and traditional media production skills.

#### Minor

The Minor in Video Game Design and Management integrates theoretical concepts and practical skills to prepare students for a career in interactive entertainment, specifically the video game industry.

#### Research

The Interactive Media Division focuses its research in the areas of games, immersive and mobile

→ Home



### Interactive Media Division Weblog

xml

#### IMD Forum for 12/2/09: Winter Showcase

Posted by abalsamo , on Wednesday, December 02, 2009 @ 22:53



search

### Recent comments

StoryObjects: Concept for Furniture Diagram and Stories  
› Tom Dec 02, 11:13

CTCS-505: Cronenberg, eXistenZ, Videodrome & Why The Game ended up sucking.

› Cynthia Dec 02, 02:55  
› Juli Dec 02, 00:30  
› Dec 02, 00:04

Filling Station (Unity 3D project)

› ryan Nov 23, 20:33  
› mbolas Nov 17, 11:57

Conversations with Edwin L. Hill

› marientina Nov 20, 08:05  
› Carmen Nov 10, 09:14

my first flash game ever... THE FISHY GAME (2006)

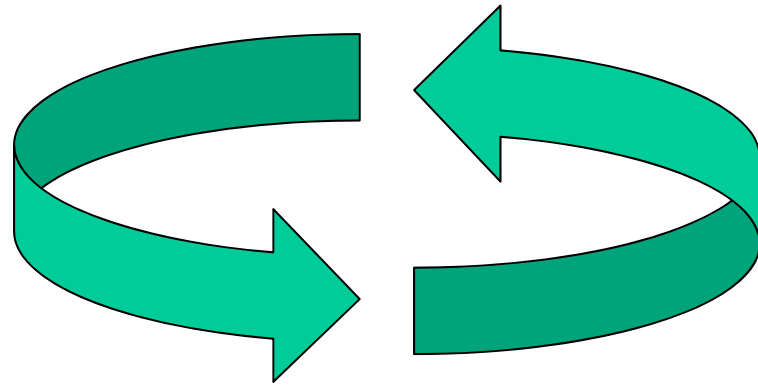
› Edmond Nov 17, 11:53  
› nikoal Nov 16, 15:01

### Recent posts

IMD Forum for 12/2/09: Winter Showcase

Dec 2 @ 10:53PM  
by Anne Balsamo  
to 511-interactive media seminar main events

Networked Science



Networked Humanities



Transforming scholarship across the university



## Carla Hesse:

**“Knowledge is no longer that which is contained in space, but that which passes through it, like a series of vectors, each having direction and duration yet without precise location or limit.**

In the future, it seems, there will be no fixed canons of texts and **no fixed epistemological boundaries between disciplines,** only paths of inquiry, modes of integration, and **moments of encounter.”**

A emergent multi-disciplinary collaboratory  
anthropology – sociology – history – law –  
literature – communications – cinema –  
computer science.

(Over 50 universities)

Technologies of Imagination



Transforming scholarship across the academy

# RE-IMAGINING THE ELECTRONIC JOURNAL

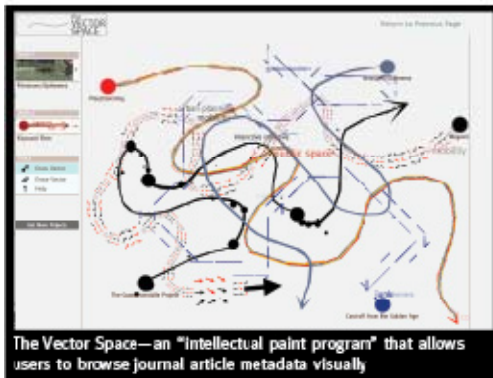
Vectors: Journal of Culture and Technology in a Dynamic Vernacular

## What is the future of academic publishing?

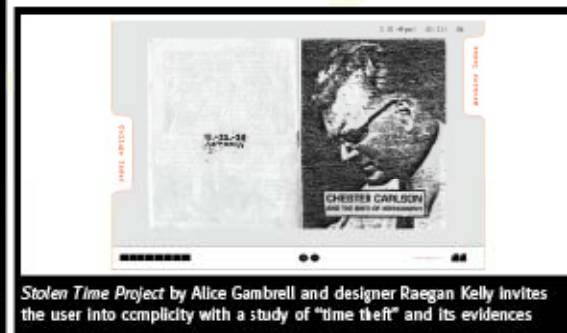
How can emerging forms of electronic publication reach broader publics while creatively exploring new forms of scholarship, collaboration and interactivity?

Published twice  
on themes that  
plinary interest

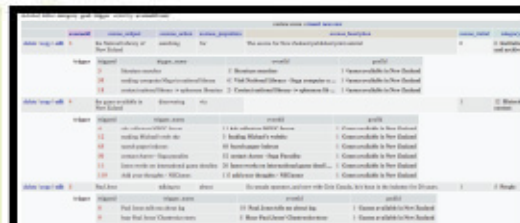
SPRING 200  
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FALL 200



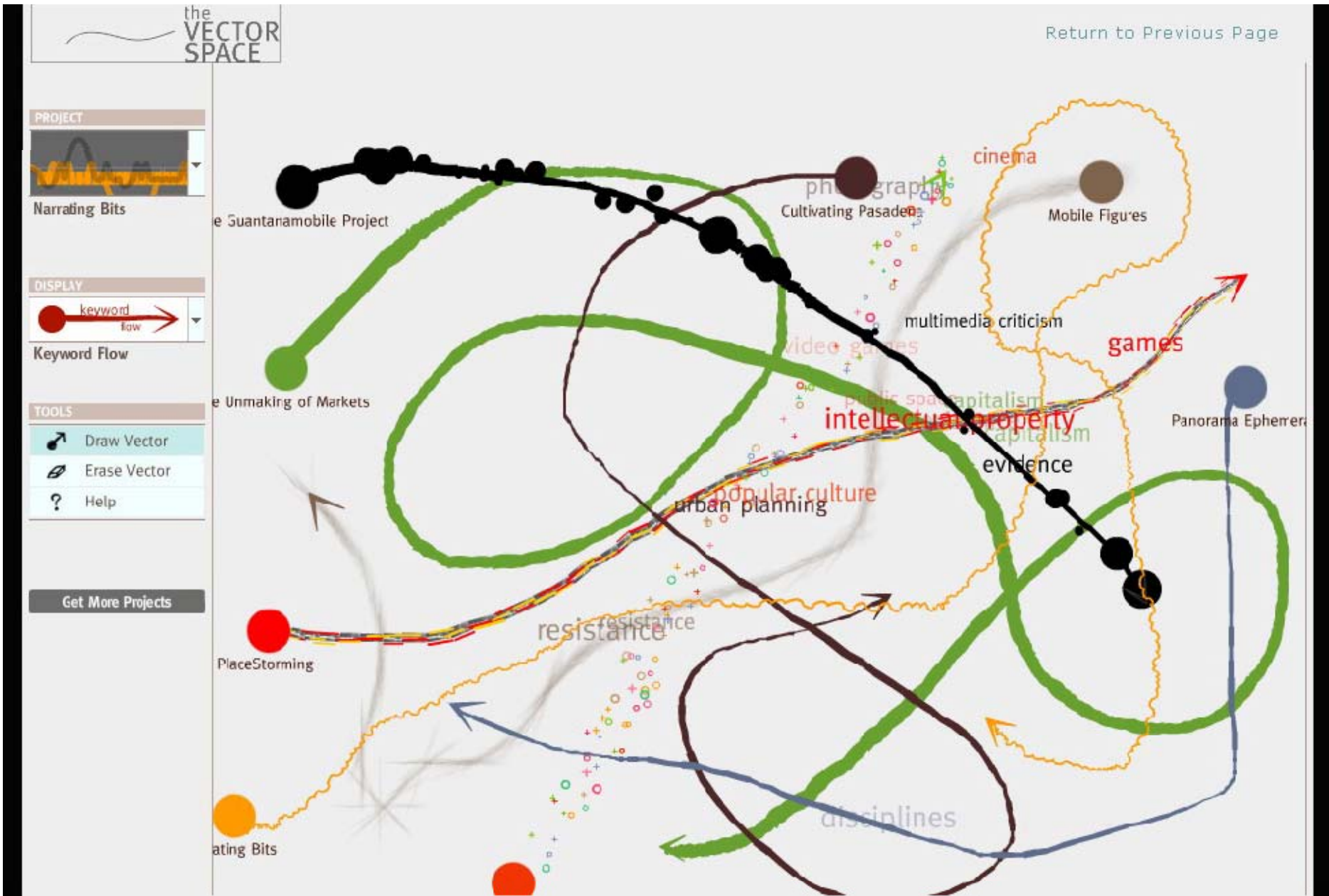
*Vectors* is an **international, electronic journal** dedicated to **expanding the potentials of academic publication** via emergent and transitional media. *Vectors* seeks to support **new modes of research**, artistic creation and cultural investigation that **analyze and redirect** the role of technology in an information-driven society.



*Vectors* is edited by Tara McPherson and Steve Anderson with Creative Direction by Raegan Kelly and Erik Loyer and Interface



*Vectors* combines **scholarship with technology** academic work that are **collaborative, extensible** *tors* mobilizes emerging technologies to reimagining **as well as writing** for the next generation of



**The Vector Space -- an "intellectual paint program" or alternative index that allows users to browse article metadata visually.**



# Public Secrets

By Sharon Daniel

Design by Erik Loyer

▲ INSIDE

OUTSIDE ▼

THE PRISON IS A

“I FIGURE  
THAT SOMEWHERE  
ALONG THE  
LINE WE ALL  
HAVE BEEN  
PUSHED AWAY  
IN OUR LIFE...”

NO-MAN'S  
LAND THAT PERFORATES

SPACE OF THE STATE

THE

“I WAS IN BEAUTY PAGEANTS, I  
WAS A BALLET DANCER... AND THEN  
I JUST MADE A MESS OF MY LIFE”

**Amelie Hastie - Associate Professor, Film Studies - UC-Santa Cruz**

....

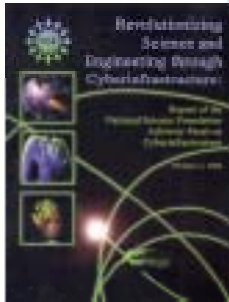
**This <Vectors> digital format allowed me both to realize and to invent a mode of thinking that was deeply collaborative and which forged connections between ideas, objects, and images.**

**... I am continually trying to think (and propose thinking to my students) dialectically and dialogically about Images and theoretical texts; for a theorist-filmmaker like Sergei Eisenstein, this entailed forming new ideas out of the "collisions" that take place between images. *Vectors* allowed me to take this notion much further than one might do in a relatively linear moving-image media or in a written text, as I was able to converge and collide multiple writings, objects, images, voices, and ideas together, which would allow the reader/viewer/visitor to reveal those connections on the screen.**



The Big Picture

# New tools, new forms of scholarship, new learners & new learning communities



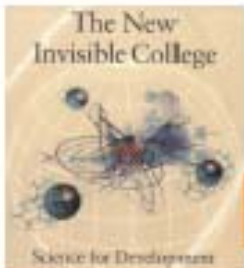
CI-enabled science & engineering research



CI-enabled humanities research

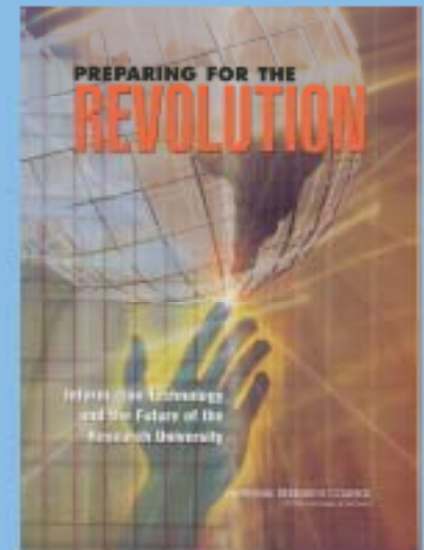


CI-enabled learning



CI-enabled global societal engagement

The  
Research  
University  
in the Digital Age



# Technologies of Imagination

Bridging the gulf between humanists/artists & technologists

Increasing role of importance of the  
Arts and Humanities for  
Innovation in 21<sup>st</sup> century –  
changing social practices in a highly  
connected world often has increased  
unexpected consequences

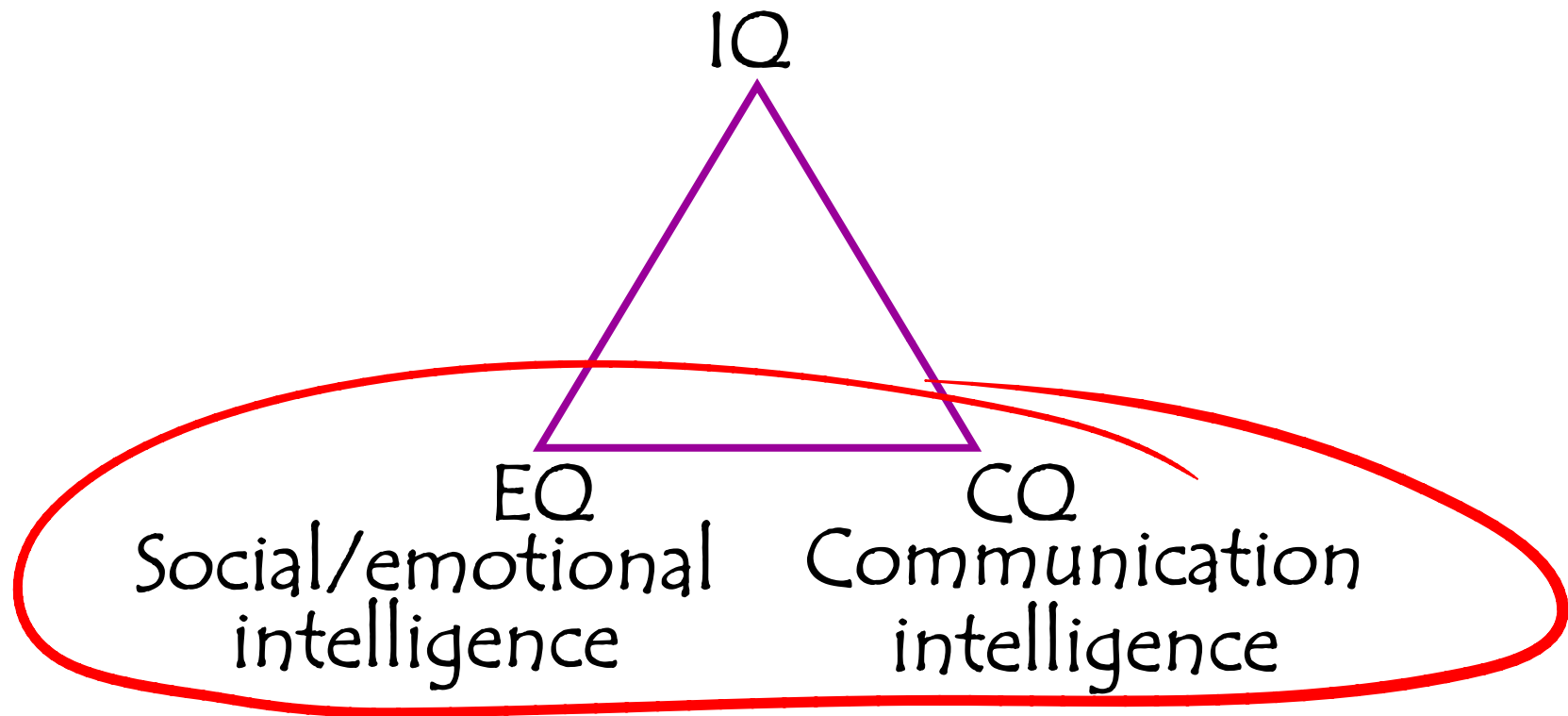
Anne Balsamo/David Goldberg HASTAC

# Implications for Engineering in an Exponential World

- ◇ Changing Role of the Engineer in this Future
  - No Longer Primarily a narrow Technical Specialist
- ◇ Knowledge Broker
  - Key “Social Node”
  - Concepts and Conceptual Developer
  - Internal Bridge between Needs and Capabilities
  - Link to External Information and Expertise
  - Inter-Disciplinary Understanding Essential

Jeff Cooper SAIC

And perhaps the most important for the 21<sup>st</sup> Century



Are we creating students that are learning to listen with humility and an open mind?

Thank You

Special thanks to  
Richard Adler – IFTF  
Dan Atkins – Umich  
Christian Sarkar

