

Title: Introduction: Science in the 21st Century


Date: Sep 08, 2008 10:00 AM

URL: <http://pirsa.org/08090055>

Abstract:



# Science is a Worldview or Why this Conference?



“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”

Isaac Asimov

# Technology

“Technology... is a queer thing. It brings you great gifts with one hand, and it stabs you in the back with the other.”

C.P. Snow

- Neither good nor evil
- A tool that we have to learn how to use properly



# Self-desorganization

- Change does not equal progress
- Believing things will work out doesn't make them happen
- Long-term goals are usually undervalued by feedback relying on instant judgment
- Progress need critical assessment of status and considerate feedback
- Change need conscious monitoring to achieve long-term goals



# Science in the 21<sup>st</sup> Century

- Larger communities
- Increasingly more knowledge
- Easier access to information
- Better connectivity
- Gets closer to the public



# Example 0: Open Access

- **Timo Hannay** (Tue 10am): Science publishing in the 21st century
- **Paul Ginsparg** (Tue 11am): The next-generation implications of open access
- **John Willinsky** (Mo 3:30pm): Will review the public impact of developments in open access to research on education, professional practice, and public policy

# Example 1: The Lisi-Peak

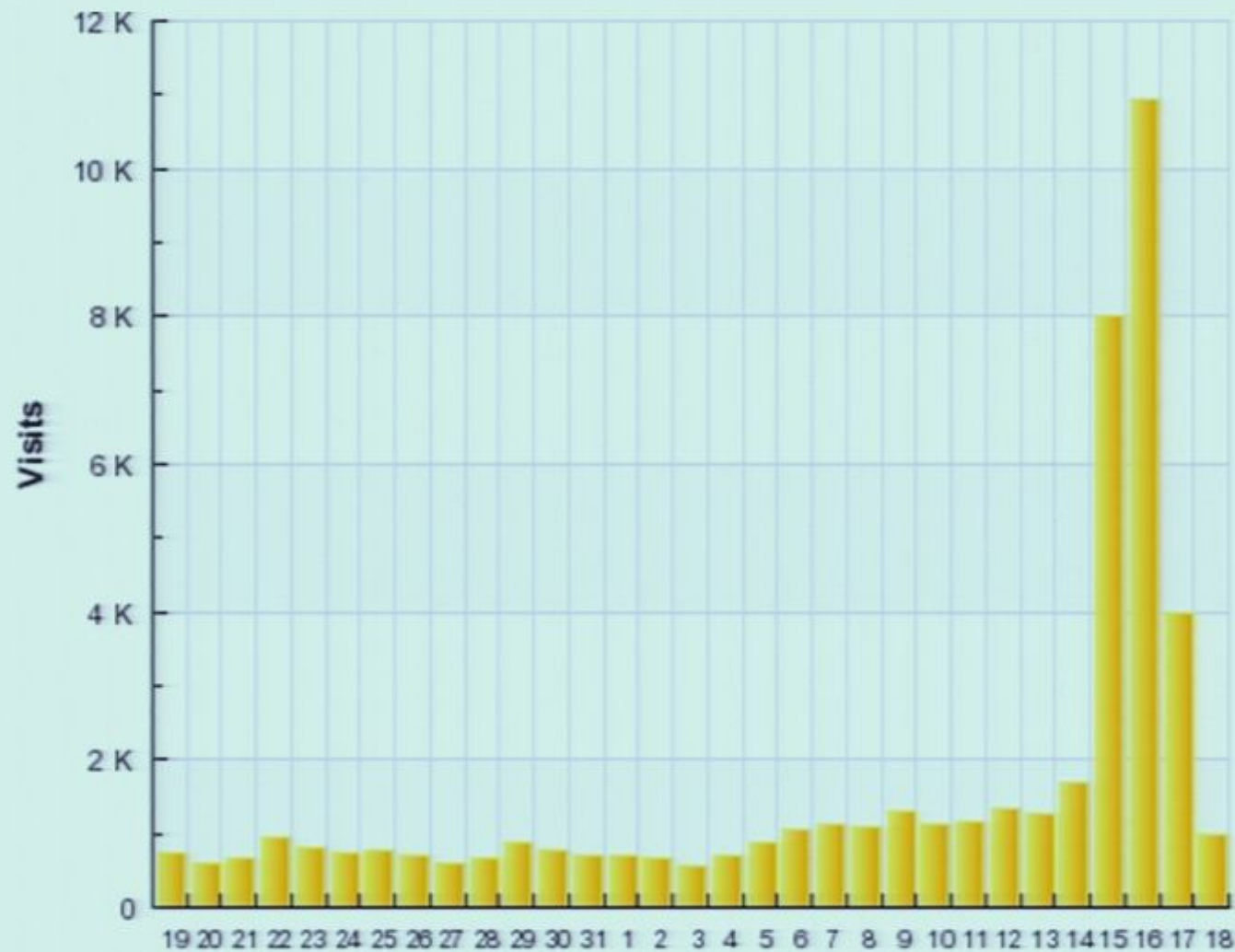


Garrett Lisi

"An Exceptionally Simple Theory of Everything"

arXiv:0711.0770v1

# Example 1: The Lisi-Peak



# Example 1: The Lisi-Peak



Surfer dude stuns physicists with theory of everything

By Roger Highfield, Science Editor

Last Updated: 6:01pm BST 14/11/2007

**Telegraph.co.uk**

Page 1 of 2

[Read comments](#)

An impoverished surfer has drawn up a new theory of the universe, seen by some as the Holy Grail of physics, which has received rave reviews from scientists.

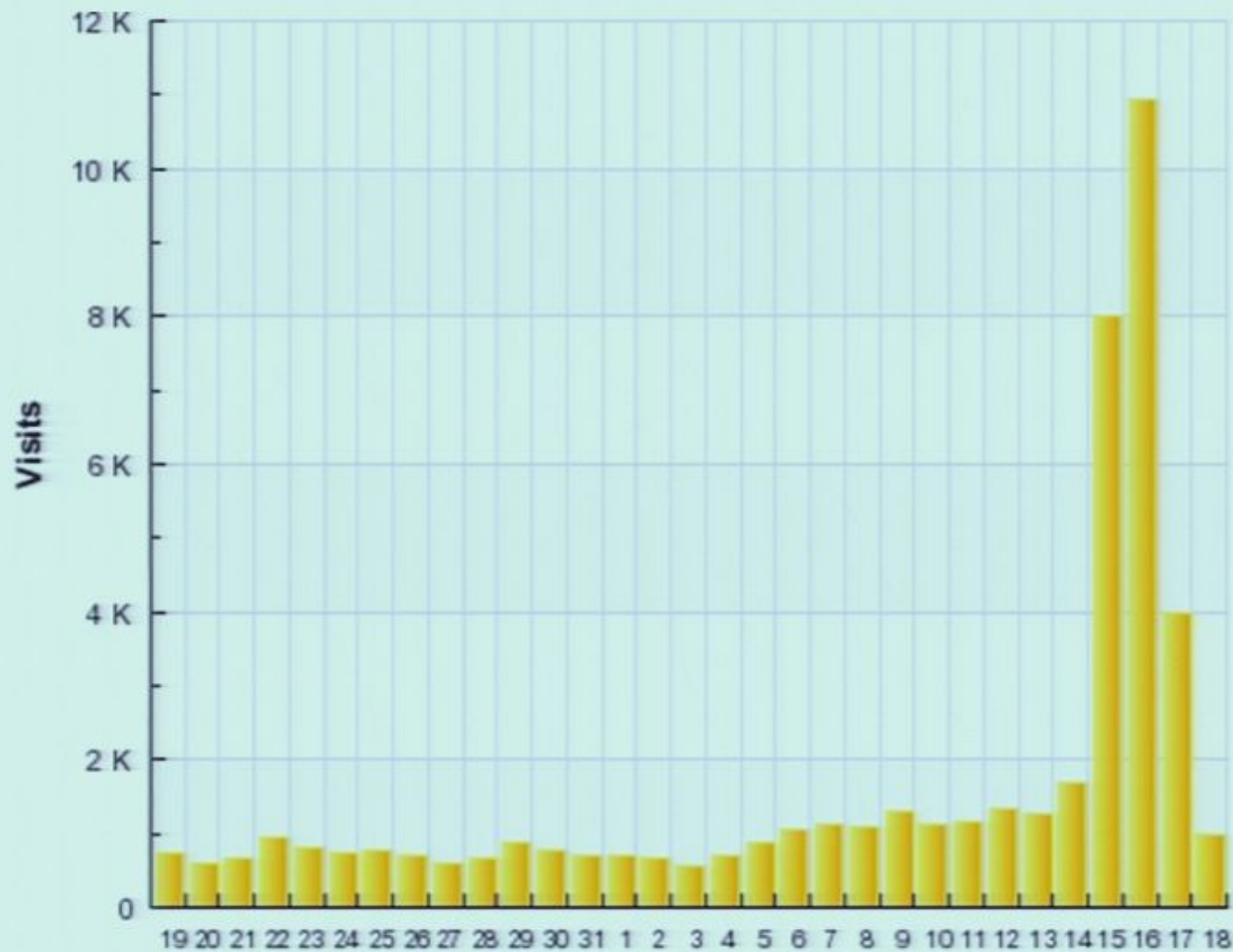
- [Garrett Lisi: This surfer is no Einstein...](#)
- [Test tube universe hints at unifying theory](#)
- [Surfer Dude's Theory of Everything - The Movie](#)

Garrett Lisi, 39, has a doctorate but no university affiliation and spends most of the year surfing in Hawaii, where he has also been a hiking guide and bridge builder (when he slept in a jungle yurt).



The E8 pattern ([click to enlarge](#)), Garrett Lisi surfing (middle) and out of the water (right)

# Example 1: The Lisi-Peak



# Example 1: The Lisi-Peak

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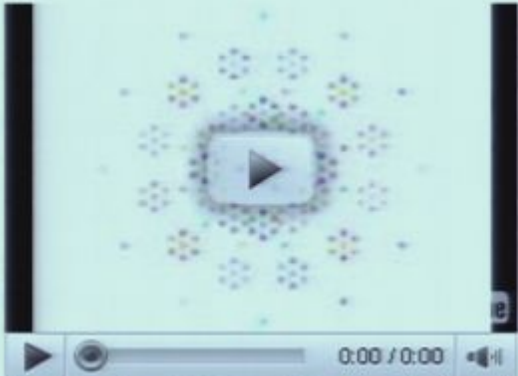
**Is mathematical pattern the theory of everything?** 

10:00 15 November 2007  
NewScientist.com news service  
Zeeya Merali

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GARRETT LISI is an unlikely individual to be staking a claim for a theory of everything. He has no university affiliation and spends most of the year surfing in Hawaii. In winter, he heads to the mountains near Lake Tahoe, California, to teach snowboarding. Until recently, physics was not much more than a hobby.

That hasn't stopped some leading physicists sitting up and taking notice after Lisi made his theory public on the physics pre-print archive this week ([www.arxiv.org/abs/0711.0770](http://www.arxiv.org/abs/0711.0770)). By analysing the most elegant and intricate pattern known to mathematics, Lisi has uncovered a relationship underlying all the universe's particles and forces, including gravity - or so he hopes. Lee Smolin at the Perimeter Institute for Theoretical Physics (PI) in Waterloo, Ontario, Canada, describes Lisi's work as "fabulous". "It is one of the most compelling unification models I've seen in many, many years," he says.



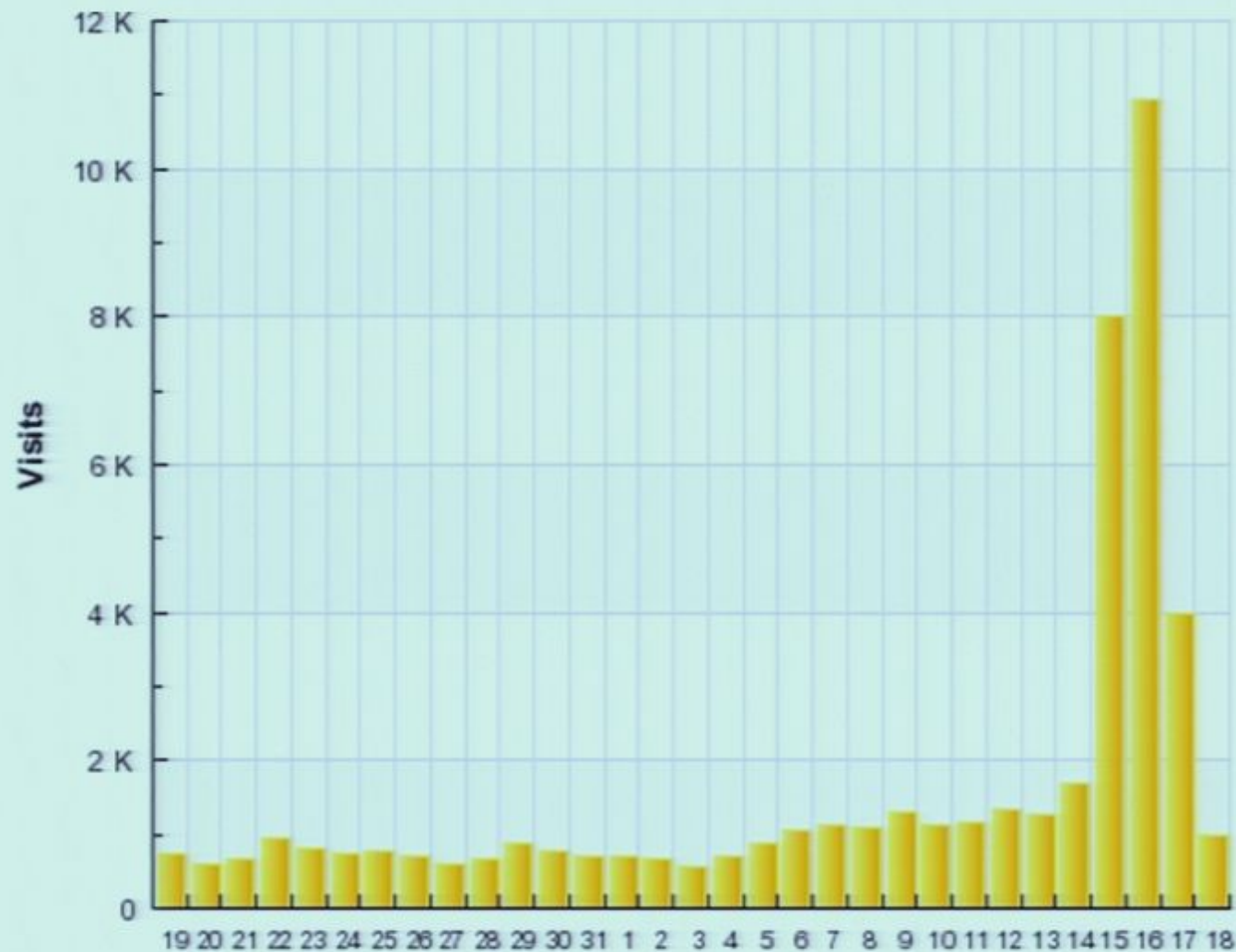
0:00 / 0:00

This elegant model by Garrett Lisi may at last reveal the link between gravity and the other fundamental forces of nature

[Watch the full-size video](#)

**MOST VIEWED** **MOST COMMENTED**

# Example 1: The Lisi-Peak





# What can we learn from this?

- Increasing public interest in science in the making
- Regarded with suspicion by community, esp. if interest in persons
- Potential influence on science
  - Actual influence: Esp. young students. Generally, people typically overestimate their rationality
  - Indirect influence: Through the believe public interest can affect funding



# Example 2: The Big Bang Myth

February 2000, BBC News (on CERN's SPS):

## **'Little Bang' creates cosmic soup**

*Scientists have created what they describe as a "Little Bang" inside which are the conditions that existed a thousandth of a second after the birth of the Universe in the so-called Big Bang.*

November 2002, CNN.com (about RHIC):

## **'Little' Big Bang stumps scientists**

*Smashing together atoms to produce conditions similar to those in the first cosmic moments, scientists came up with some startling results that could force them to reexamine their understanding of the universe.*

March 2007 MSNBC (about the LHC):

## **Teams toil underground to re-create big bang**

*It is a \$4 billion instrument that scientists at the European Center of Nuclear Research, or CERN, hope to use to re-create the big bang — believed to be the event that caused the beginning of the universe — by crashing protons together at high speed.*



# What can we learn from this?

- Cheap advertisement for the sake of entertainment and popularity goes on expenses of accuracy
- Erosion of trust
- Long-term prognosis: Disastrous.
- How to improve communication between scientists and journalists?
- Which feedback guarantees quality?

# Example 3: Black Hole Catastrophe

WorldNetDaily

## Will black holes swallow Earth?

### Doomsday fears ignited by big-bang machine

Posted: May 23, 2008

11:40 pm Eastern

© 2008 WorldNetDaily

Could the upcoming launch of the world's biggest atomic particle smasher – nicknamed the Big Bang Machine – touch off a cataclysmic event that dooms our planet?

That's the fear of some critics of the Large Hadron Collider in Switzerland, which is built to slam protons together at an unprecedented peak [energy](#) of 14 trillion electron volts – nearing levels scientists believe were reached in the first microseconds after the "big bang."



The Large Hadron Collider

# Example 3: Black Hole Catastrophe

WorldNetDaily

## Will black holes swallow Earth?

### Doomsday fears ignited by big-bang machine

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Posted: May 23, 2008

11:40 am Eastern

The New York Times  
nytimes.com

C

W March 29, 2008

## Asking a Judge to Save the World, and Maybe a Whole Lot More

By DENNIS OVERBYE

More fighting in Iraq. Somalia in chaos. People in this country can't afford their mortgages and in some places now they can't even afford rice.

None of this nor the rest of the grimness on the front page today will matter a bit, though, if two men pursuing a lawsuit in federal court in Hawaii turn out to be right. They think a giant particle accelerator that will begin smashing protons together outside Geneva this summer might produce a black hole or something else that will spell the end of the Earth — and maybe the universe.

Scientists say that is very unlikely — though they have done some checking just to make sure.

The world's physicists have spent 14 years and \$8 billion building the Large Hadron Collider, in which the colliding protons will recreate energies and conditions last seen a trillionth of a second after the Big Bang. Researchers will sift the debris from these primordial recreations for clues to the nature of mass and new forces and symmetries of nature.

But Walter L. Wagner and Luis Sancho contend that scientists at the European Center for Nuclear Research, or CERN, have played down the chances that the collider could produce, among other horrors, a tiny black hole, which, they say, could eat the Earth. Or it could spit out something called a "strangelet" that would convert our planet to a shrunken dense dead lump of something called "strange matter." Their suit also says CERN has failed to provide an environmental impact statement as required under the National Environmental Policy Act.

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ANI

## Large Haudron Collider could spell doomsday for Earth!

Monday, 01 September , 2008, 15:27

Last Updated: Monday, 01 September , 2008, 15:36





**Washington:** Some scientists are trying to stop the Large Hadron Collider (LHC) from going into operation in nine days, saying that it might create black holes which could destroy the world.

The LHC, located 300 ft underground near the French-Swiss border, is a

machine that is 17 miles long and cost 4.4 billion pounds to create.

# Example 3: Black Hole Catastrophe

WorldNetDaily

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Will black holes swallow Earth?  
Doomsday fears ignited by big-bang machine

Large Haudron Collider could spell doomsday for Earth!

ANI

Posted: May 23, 2008

11:40 am Eastern

Monday, 01 September, 2008, 15:27

Last Updated: Monday, 01 September, 2008, 15:26

The New York Times  
nytimes.com

'Big Bang' machine could destroy the planet,  
says lawsuit

Telegraph.co.uk

By Tom Leonard in New York  
Last Updated: 12:01am BST 01/04/2008

March 29, 2008

Asking a Judge to Stop  
By DENNIS OVERBYE

A giant particle accelerator that mimicks the effects of the "Big Bang" could destroy all life on Earth by sucking it into a black hole, a lawsuit claims.

- **The Big Bang: atom-smashing could uncover truth**
- **Time travellers from the future 'could be here in weeks'**
- **Is our cosmos teeming with alien 'unmatter'?**

Walter Wagner, who runs a botanical garden on Hawaii's Big Island, and Luis Sancho, a Spaniard, have asked for an injunction to prevent the European Centre for Nuclear Research, or Cern, starting up the Large Hadron Collider.

The accelerator, which will be the world's most powerful particle smasher, is due to begin hurling protons at each other at its base outside Geneva this summer.

Physicists hope that the device, which has taken 14 years and £4 billion to build, will provide clues to the universe's origins by mimicking its condition a trillionth of a second after the Big Bang.

Although Cern scientists have already ruled

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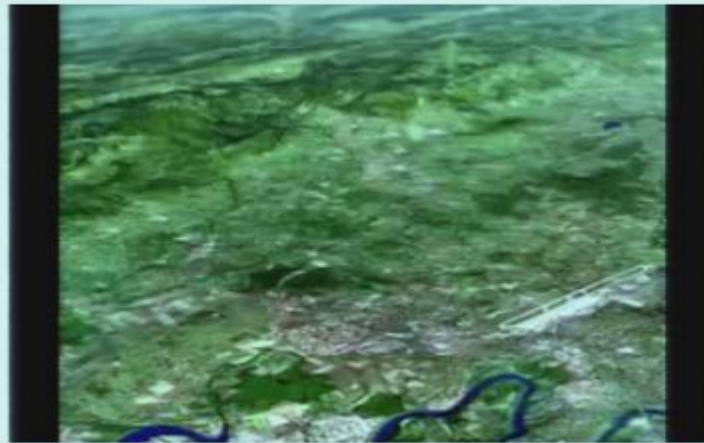
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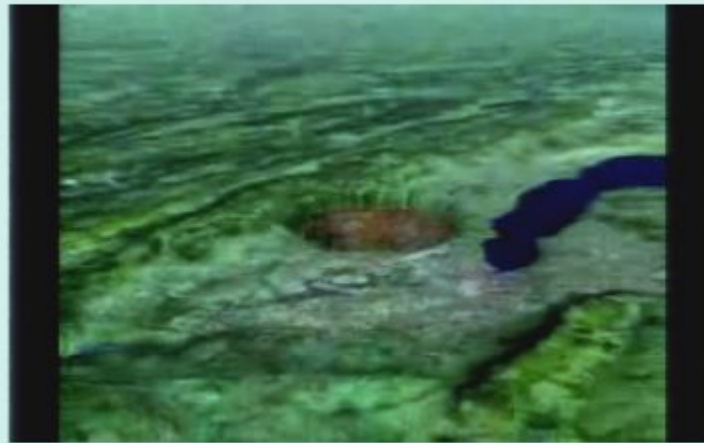


# Example 3: Black Hole Catastrophe



[Video: Misunderstood Universe/YouTube]

# Example 3: Black Hole Catastrophe



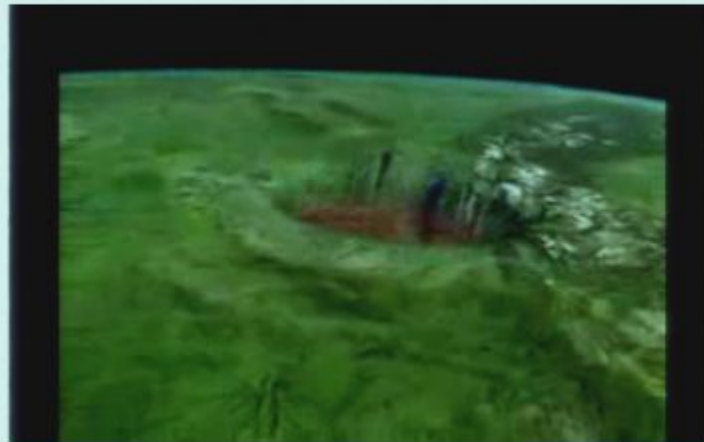
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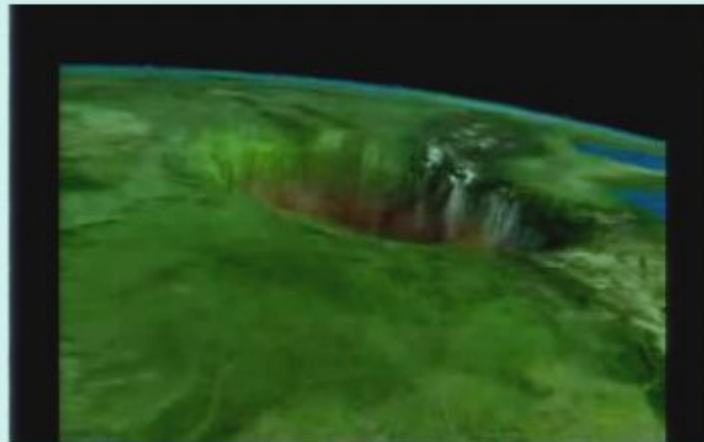
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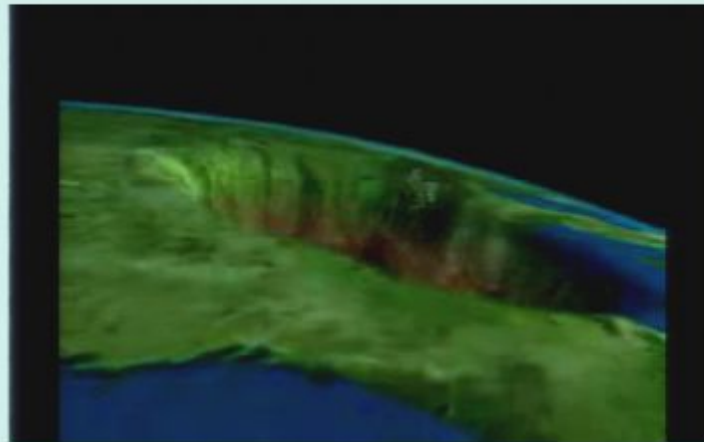
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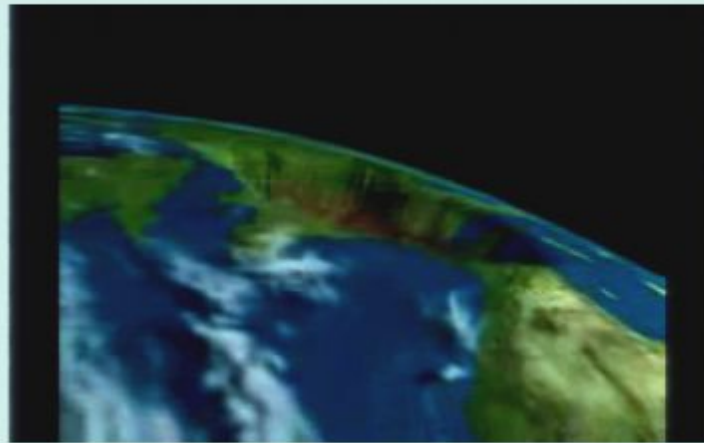
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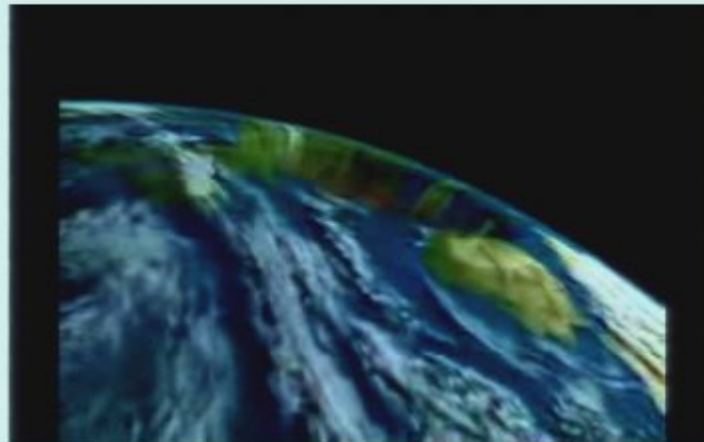
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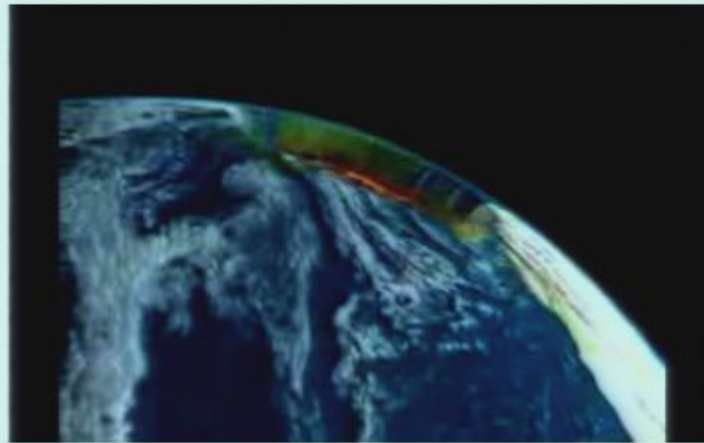
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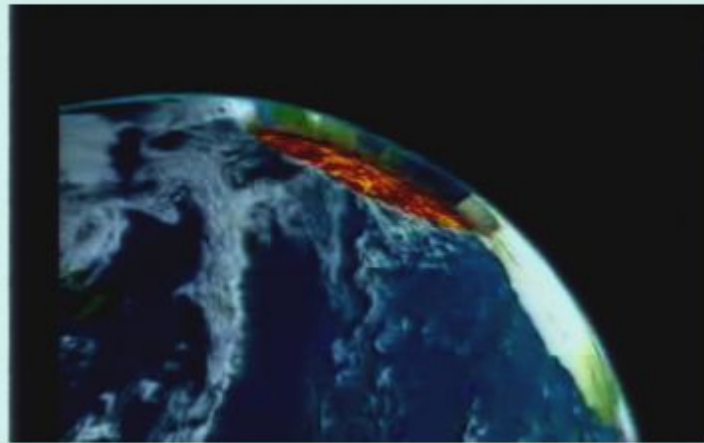
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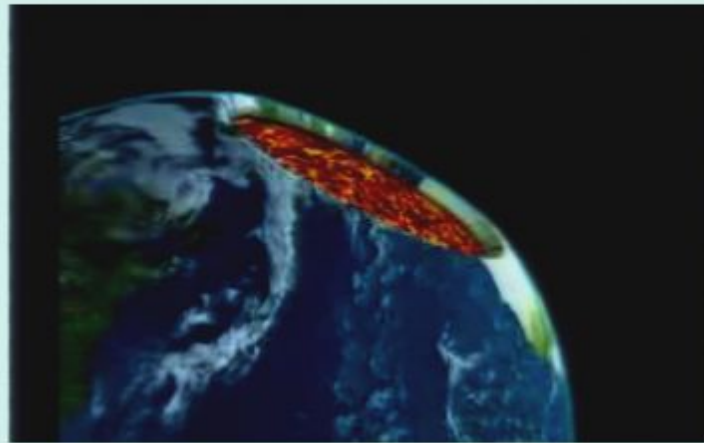
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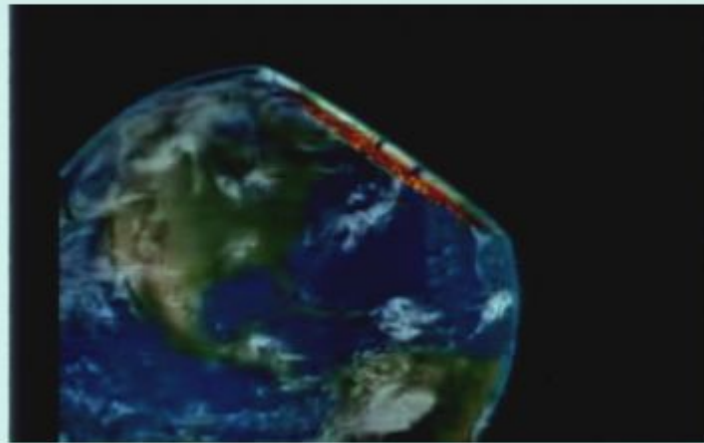
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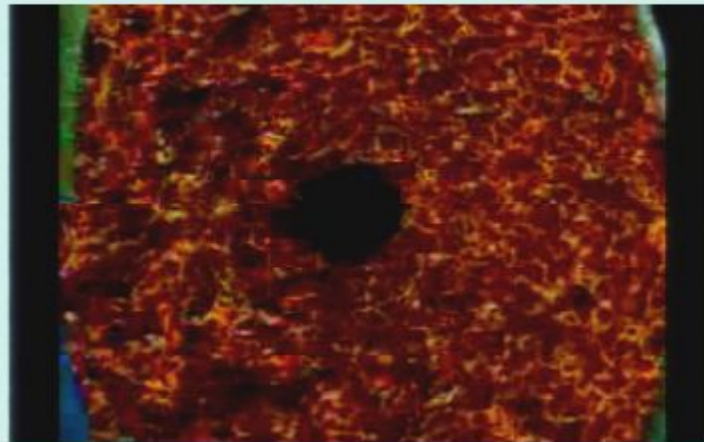
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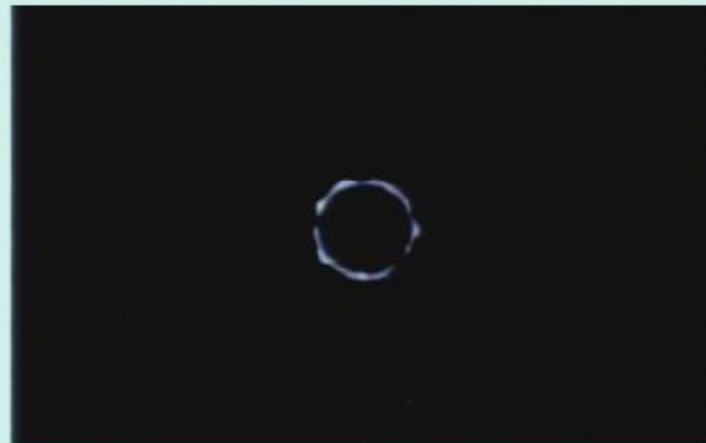
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## Particle smasher 'not a threat to the Earth'

16:57 28 March 2008  
NewScientist.com news service  
Hazel Muir

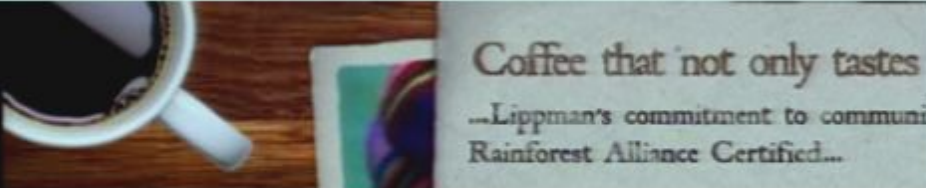
Campaigners in the US are attempting to delay the start-up of the world's most powerful particle smasher with a lawsuit claiming it could spawn dangerous particles or mini black holes that will destroy the entire Earth.

The Large Hadron Collider (LHC) is nearing completion at CERN, the European centre for particle physics near Geneva, Switzerland. Scientists hope it will begin operations in mid-July.

On 21 March, Luis Sancho, from Spain, and Hawaii resident Walter Wagner filed a lawsuit in Hawaii's US District Court against CERN and US contributors to the project demanding that they do not operate the LHC until they prove it is safe. The US contributors named are the Department of Energy (DoE), the National Science Foundation and Fermilab, an accelerator laboratory near Chicago.

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## If The Large Hadron Collider Produced A Microscopic Black Hole, It Probably Wouldn't Matter

*ScienceDaily (June 30, 2008)* — Particle colliders creating black holes that could devour the Earth. Sounds like a great Hollywood script. But, according to UC Santa Barbara Physics Professor Steve Giddings, it's pure fiction.

See also:

### Space & Time

- Black Holes
- Astrophysics
- Astronomy

### Matter & Energy

- Quantum Physics
- Physics
- Albert Einstein

Giddings has co-authored a paper documenting his study of the safety of microscopic black holes that might possibly be produced by the Large Hadron Collider (LHC), which is nearing completion in Europe. The paper, co-authored by Michelangelo Mangano of the European Center for Nuclear Research (CERN), which is building the world's largest particle collider, investigates hypothesized



A worker inside the Large Hadron Collider tunnel.  
(Credit: Copyright CERN)

# Example 3: Black Hole Catastrophe



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See also:

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## Physics & Math / Cosmology

### The Extremely Long Odds Against the Destruction of Earth

Don't be too concerned that the world's largest particle accelerator is about to go online.

by The Editors  
published online July 24, 2008



A worker inside the Large Hadron Collider tunnel.  
(Credit: Copyright CERN)

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Page last updated at 16:58 GMT, Monday, 23 June 2008 17:58 UK

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## Earth 'not at risk' from collider

By Paul Rincon  
Science reporter, BBC News

Our planet is not at risk from the world's most powerful particle physics experiment, a report has concluded.

The document addresses fears that the Large Hadron Collider is so energetic, it could have unforeseen consequences.

Critics are worried that mini-black holes made at the soon-to-open facility on the French-Swiss border might threaten the Earth's very existence.

But the report, issued by the European Organization for Nuclear Research, says there is "no conceivable danger".



Atlas is the biggest experiment housed at the LHC

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# Example 3: Black Hole Catastrophe

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August 29, 2008 - 4:19 PM

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## Court rejects protest against Big Bang machine

**The European Court of Human Rights has rejected a complaint against the planned launch of the world's most powerful particle accelerator near the Swiss-French border.**

Opponents, including the German biochemist Otto Rössler, tried to block the experiment due to begin on September 10, saying it would result in black holes that could suck up the Earth.

The European Organization for Nuclear Research (Cern) welcomed the court ruling on Friday. It dismisses accusations that the experiment is irresponsible and risky.

Page 41/82

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# What can we learn from this?

- Larger public interest requires larger personal commitment from scientists
- Where to take the time, or rspt. whose task is it to deal with that?
- Is that effort presently sufficiently acknowledged?
- Solution: Task-specific division of labor, CV suitable appreciation, i.e. acknowledge management is necessary and a needed skill

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*"My taxes pay you!"*

# Closer to the Public: Pros and Cons

**Harry Collins** (Wed 10am):  
Electronic media and specialist knowledge

- + Public interest in research
  - + Potentially better science literacy
  - + Lowering barriers to education
  - + Embraces outsider knowledge
- 
- Lacking accuracy, and loss of trust
  - Public pressure on research directions
  - Increased time pressure on researchers
  - Believe that science is cheap

**Cause: Information and knowledge mismanagement**

## Closer to the Public: Pros and Cons

## Harry Collins (We

Electronic med

edge

- + Public interest in research
  - + Potentially better science literacy
  - + Lowering barriers to education
  - + Embraces outsider knowledge
- Lacking accuracy
- Public perception gets closer to the public"
- Increasingly close to researchers
- Cheap
- Discussion Mo 4:30  
Moderator: Eva Amsen  
Panelists: Orzel, John Willinsky, C.

Causation and knowledge mismanagement

# Openness in Science: Side-effect

Low scientific content and lack of references supports the believe that education is unnecessary (“the PhD is a hoax”)

- + Easy and fast reachability of well known scientists
- = The “Ivory Tower” gets swamped with ideas that do not reach the scientific standard

# Result: Hierarchies in Scientific Communication

- Fast filtering of incoming information necessary - if name not known and sender address obscure, then ignore
- Reply to requests on own level or above
- Danger: Missing useful information, reinforcing a closed academic society, leveled by “importance”

## Cause: Information and knowledge mismanagement

- Solution: Better communication of scientific methods, offer place to address questions, decentralize

More general: Do scientists embrace openness?

**Michael Nielsen (Tue 2pm):**

***Cultural openness and its connection to online innovation in science***



# Science, Information and Knowledge needs Management

# The Illusion of Knowledge

**“The greatest obstacle to discovering the shape of the earth, the continents, and the oceans was not ignorance but the illusion of knowledge.”**

**Daniel J. Boorstin**

Is supported by the internet because:

- Availability: Information is cheap, everybody can “know” everything
- The believe that information equals knowledge
- The believe that relevant information which is online can be found easily
- Infotainment: the believe that learning must be easy, and if a topic is complicated, it must be the fault of the person explaining it
- If it's not on the internet it doesn't exist
- Because online one can find support for whatever point of view one holds

**Cause: Information and Knowledge mismanagement**



# Information Overload

“Difficulties in locating, retrieving, processing, storing and/or reretrieving information due to the volume of available information.”

“Information overload may lead to stress, health problems, frustration, disillusionment, depression, as well as impaired judgment and bad decision making.”

Behr, Nosper, Klimmt & Hartmann (2005)



# Information Overload

A growing amount of research shows decline in productivity through work interruptions and trouble concentrating.

Reason for industry to act.

# Information Overload



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## Our Mission:

We work together to build awareness of the world's greatest challenge to productivity, conduct research, help define best practices, contribute to the creation of solutions, share information and resources, offer guidance and facilitation, and help make the business case for fighting information overload. [More about IORG...](#)

## What's happening? **NEW**

**Aug. 11, 2008**

With our inaugural [conference](#) over, the IORG steering team (after catching its breath...) is now working to define future activities for our new organization. Stay tuned... and meanwhile, any and all suggestions and insights you care to [share](#) are welcome! [Previous News items...](#)

## Featured Article

**So Where Was I? A conversation on workplace interruptions**  
Yoram Kalman interviews Dr. Gloria Mark from the Department of Informatics at UC Irvine.  
[Read the interview](#)

## Members' Blog

Latest post: [Lots going on in the information overload world](#)

## Tip of the Month

Set up a "Five Weeks Folder" to eliminate "Deletion anguish!"  
[Tip details...](#)

See more tips in [Tips archive](#)

## Join IORG!

[Click here for IORG membership info](#)



# Information Overload

- What about academia?

# Information Overload

“The breathless infotainment style of the media in modern democracies is understandable in a journalistic world operating at breakneck speed and plagued by info-glut, but it is **completely inappropriate in an increasingly complex world that demands increasingly sophisticated policy making.**”

~Thomas Homer-Dixon, *The Ingenuity Gap* (2000)



**Beth Noveck (Thu 10 am):**

Science in politic decision-making. How technology changes the nature of expertise in public decision-making and new opportunities for the scientific community to inform policy-making. **4:30 pm** "Design Exercise"

# Information Behaviour of the Researcher of the Future”

Report by CIBER, University College London, Jan 2008:

“The report ‘Information Behaviour of the Researcher of the Future’ [...] shows that research-behaviour traits that are commonly associated with younger users – **impatience in search and navigation, and zero tolerance for any delay in satisfying their information needs – are now the norm for all age-groups, from younger pupils and undergraduates through to professors.** ‘These findings add to our growing understanding of subjects that should concern all who work in further and higher education – the changing needs of our students and researchers and how libraries can meet their needs.’

The study calls for libraries to respond urgently to the changing needs of researchers and other users and to understand the new means of searching and navigating information. Learning what researchers want and need is crucial if libraries are not to become obsolete, the report warns.

The findings also send a stark message to government – that **young people are dangerously lacking information skills.** Well-funded information literacy programmes are needed, it continues, if the UK is to remain as a leading knowledge economy with a strongly-skilled next generation of researchers.”

(Summary: Joint Information Systems Committee)



# Citation Behavior

“Electronic Publication and the Narrowing of Science and Scholarship”

**James A. Evans**

*Science* 18 July 2008:

Vol. 321. no. 5887, pp. 395 – 399

- Online journals require less browsing and allow a very targeted search, lowering “accidental” broadness and diversification of interests.
- Study shows that references tended to be more recent, fewer journals and articles were cited, and more of those citations were to fewer journals and articles.

# Better Connectivity: Pros and Cons

- + Easier to find collaborators who share interests
- + Social networking makes it easier to find relevant information
- + Saves time
- Supports specialization
- Networking can become so useful that social skills dominate scientific skills
- Wastes time

“Futures made of virtual insanity  
now always seem, to be governed by  
this love we have  
For useless, twisting, our new technology”

Jamiroqua



# Science, Information and Knowledge needs Management



# Science, Information and Knowledge needs Management

- Larger communities
- Increasingly more knowledge
- Easier access to information
- Better connectivity
- Gets closer to the public



# The Fall of the Ivory Tower

Objectivity, honesty and criticism are essential for science. On the short term, we have only ourselves to judge on each other.

Functionality of scientific discourse is severely affected by:

- Peer Pressure
- Financial Pressure
- Time Pressure
- Public Pressure

# Present Academic System

## Favored

**Steve Fuller (Wed 11am)**

- Specialization (results in fragmentation)
- Use of shortcuts, e.g. easy measures and metascientific instruments, or reliance on other's judgment
- Fulfillment of secondary criteria (papers, citations, connections, appropriately timed projects) as opposed to primary goals (good science) – leads to: advertisement

## Disfavored

- Interdisciplinarity
- Long term and risky projects
- Anything that can't be put in the CV

**Eric Weinstein (Thu 2pm):  
Intellectual hedge funds**

# Mismanagement of Academia

## Result:

- Inefficient use of time, human and financial resources
- Sociological effects resulting in bubbles of nothing



**David Kaiser (Wed 2:00 pm)**  
**Booms and busts in the history of science**



# Mismanagement of Academia

Solution: Everything that lowers 4 pressures

- Don't tie researchers to topics or supervisors
- Support for appropriate time-period
- Counteract specialization by field, encourage interdisciplinarity
- Discourage advertisement, encourage honesty and open criticism
- Discourage use of oversimplified measures
- Encourage and acknowledge specialization in task (e.g. internal and external communication)

# Mismanagement of Academia

Solution: Everything that lowers 4 principles

- Don't tie researchers to their disciplines
- Support for appropriate specialization
- Counteract specialization by encouraging interdisciplinary work
- Discourage oversimplified measures to encourage honesty and transparency
- Acknowledge specialization in internal and external communication)

Discussion Wed 4:30 pm  
Power and Progress: Democracy and Ethics in Science  
Moderation: Steve Weinstein  
Panelists: Harry Collins, David Kaiser, Lee Smolin

# These are not new insights...

“[Y]ou should not fool the layman when you're talking as a scientist. I am not trying to tell you what to do about cheating on your wife [...] I'm talking about a specific, extra type of integrity that is not lying, but bending over backwards to show how you're maybe wrong, that you ought to have when acting as a scientist. And **this is our responsibility as scientists, certainly to other scientists, and I think to laymen.**”

“So I have just one wish for you -- the good luck to be somewhere where you are free to maintain the kind of integrity I have described, and where you do not feel forced by a need to maintain your position in the organization, or financial support, or so on, to lose your integrity. May you have that freedom.”

Richard Feynman, 1974

# These are not new insights...

“If a committee of scientific experts selects research projects by majority vote, projects in fashionable fields are supported while those in unfashionable fields are not. In recent decades, the **fashionable fields have been moving further and further into specialized areas [...].** Both in pure science and in applied science, **rule by committee discourages unfashionable and bold ventures.**”

Freeman Dyson, *Can Science be Ethical?* ('97 after a '95 lecture)

# These are not new insights...

“Hiring committees, chairs, and deans often have another goal in mind, which is to raise (or in fortunate cases, preserve) the status of the department. By this I mean something more measurable than a young scientist's promise, for **measures of status are given by numerical rankings**. These are made by external evaluators, who combine their impressions with numbers like total grant funding and numbers of citations. Department chairs and deans have to be concerned with this, because **such matters have brute financial repercussions relevant for their own careers as administrators**. It is, first of all, important to hire people who are likely to win generous grant support. This immediately favors members of large established research programs over initiators of new programs [...] **The goal, then, is not to hire the scientist most likely to do good science, but the scientist whose acquisition will optimize the status of the department in the short term.**”

Lee Smolin, in *The Trouble with Physics* (2006)

**Lee Smolin (Wed 3:30 pm):**

Ethical principles in the scientific community  
and challenges of increased connectivity

# These are not new insights...

“In my limited experience, grant applications do not describe what you will actually do but are in reality an ingenuity and knowledge test in which **honesty is little valued** [...] One needs a shrewd idea of what might impress the assessment committees. **In am not sure how well time or science is served by this rather weird process.**”

Peter Lawrence, *Lost in publication: how measurement harms science* (2008)

# Scientific Utopia

Leaves one to wonder why, if the problem is so well known, hasn't anybody done something about it?

**Wellman, Barry (Thu 2pm):** The internet revolution, the mobile revolution, and the social network revolution

- Survivor bias?
- Believe in self-organization?
- Part of the society we live in?
- Habit + Inertia?
- System disabling its own improvement?

**Andrew Odlyzko (Tue 3:30 pm)**  
The supreme power of inertia

Discussion Thu 8:00 pm

*Scientific Utopia: Alternative Forms of Scientific Institutions*

Moderation: Lee Smolin

Panelists: Garrett Lisi, Eric Weinstein, Robin Blume-Kohout



# Science, Information and Knowledge needs Management



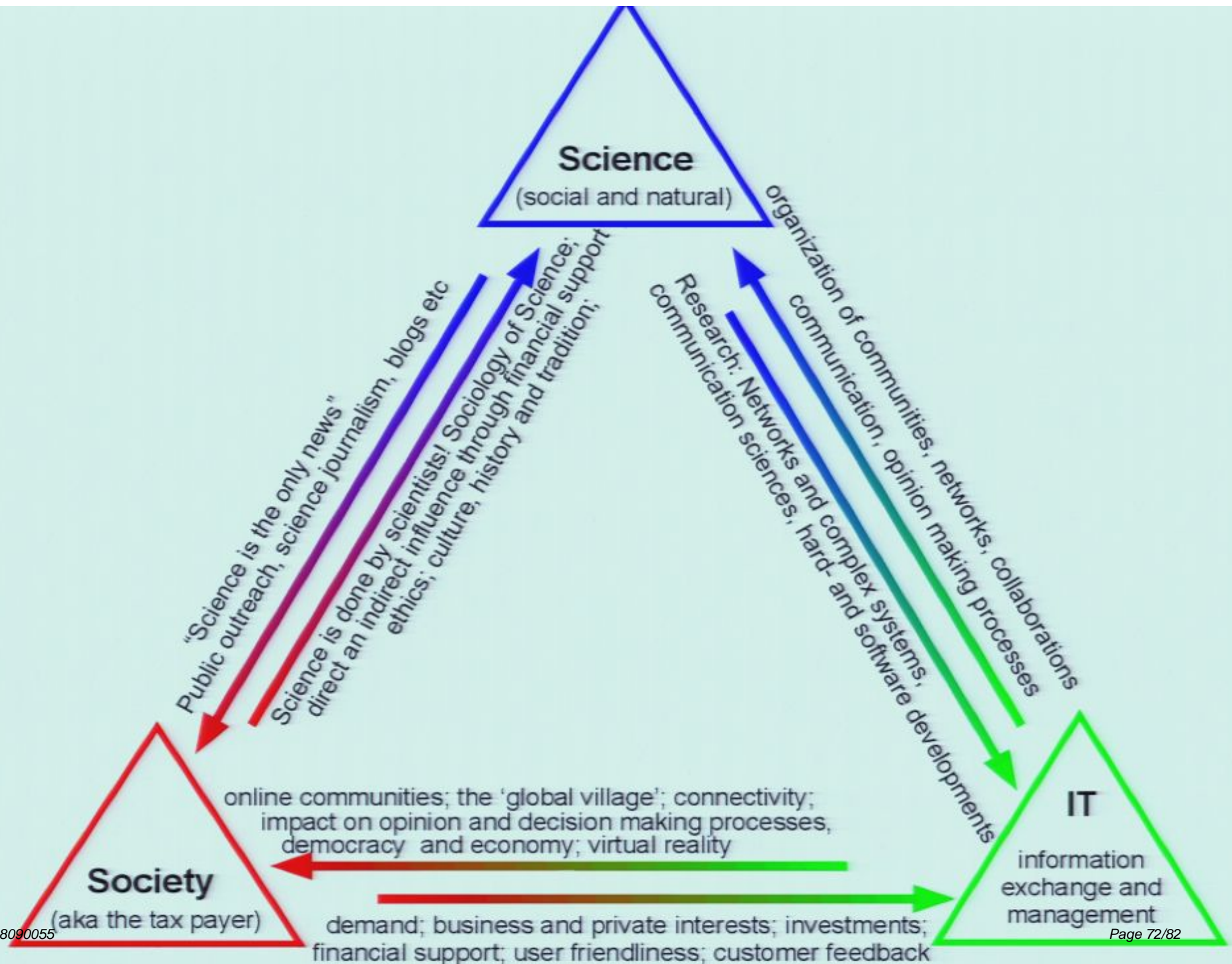
# Science in the 21<sup>st</sup> Century

## Internal:

- Management of knowledge
- Organization of information
- Structure of collaboration
- Sociology and ethics

## External:

- Incorporating knowledge
- Openness
- Communication to non-experts





# Science - IT

- **Chad Orzel** (Mo 11am) : Weblogs and public outreach
- **Jacques Distler** (Mo 2 am): Blogs, Wikis, MathML: Scientific Communication
- **Greg Wilson** (Fri 10 am): Can the Web Make Scientists Brush Their Teeth?
- **Cameron Neylon** (Fri 11am): How he learned to stop worrying and love his blog

# Science - IT

- **Chad Orzel** (Mo 11am) : Web 2.0 and the Future of Science
  - **Jacques Distler** (Mo 2pm) : The Scientific Community and the Future of Science
  - **Greg Wilson** (Mo 4pm) : The Future of Science and the Future of the Scientist
  - **Chad Orzel** (Tue 4:30pm) : The Future of Scientific Collaboration
- Discussion Tue 4:30pm  
The Future of Scientific Collaboration  
Moderation: John Dupuis  
Panelists: Simeon Warner, Michael Nielsen, Timo Hannay

# Science - IT

- Scientometric: Allows to analyze the community's collaboration structures and dynamics
- Metascientific tool both to learn and to manage (...)

**Katy Börner** (Tue 2pm): Maps of Science, generated through scientific analysis of large-scale scholarly datasets

**Poster exhibition downstairs in the lobby!**

**Alex Pang** (Mo 7pm): Roadmapping the Future of Science



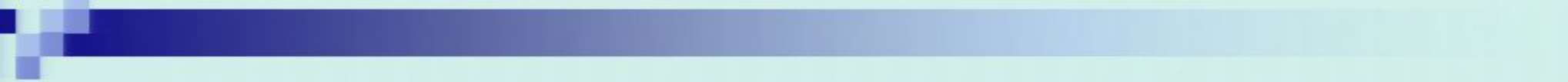
# Topics not covered

- **Data storage, resilience of**
- **Science education**
- **Information overload**
- **The Future of Democracy**



# The Big Picture





“The saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.”

Isaac Asimov



# The Global Scientific Community

- Necessary to solve the problems mankind is facing – on a global level
- Input desperately needed – we don't have time anymore to proceed by trial and error
- Need to reestablish trust in the institutions governing our lives
- But first have to ensure own functionality



# So - Why this conference?

- Science is more than a profession - it's a worldview
- We need science to move on
- And science needs us



# Science, Information and Knowledge needs Management