

# Open Source Science

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*with the support of the  
LiquidPub project team*



## Challenge: doing science in the 21<sup>st</sup>

- The Web has changed many fields:
  - News (blogs, RSS feeds, ...)
  - Music (p2p networks, iTunes, lastFM, ...)
  - Travel (Orbiz, Google maps,...)
  - Photos (Flickr, ...)
  - ...
- Has it changed also scientific knowledge production and dissemination processes ?



# Challenge: doing science in the 21<sup>st</sup>

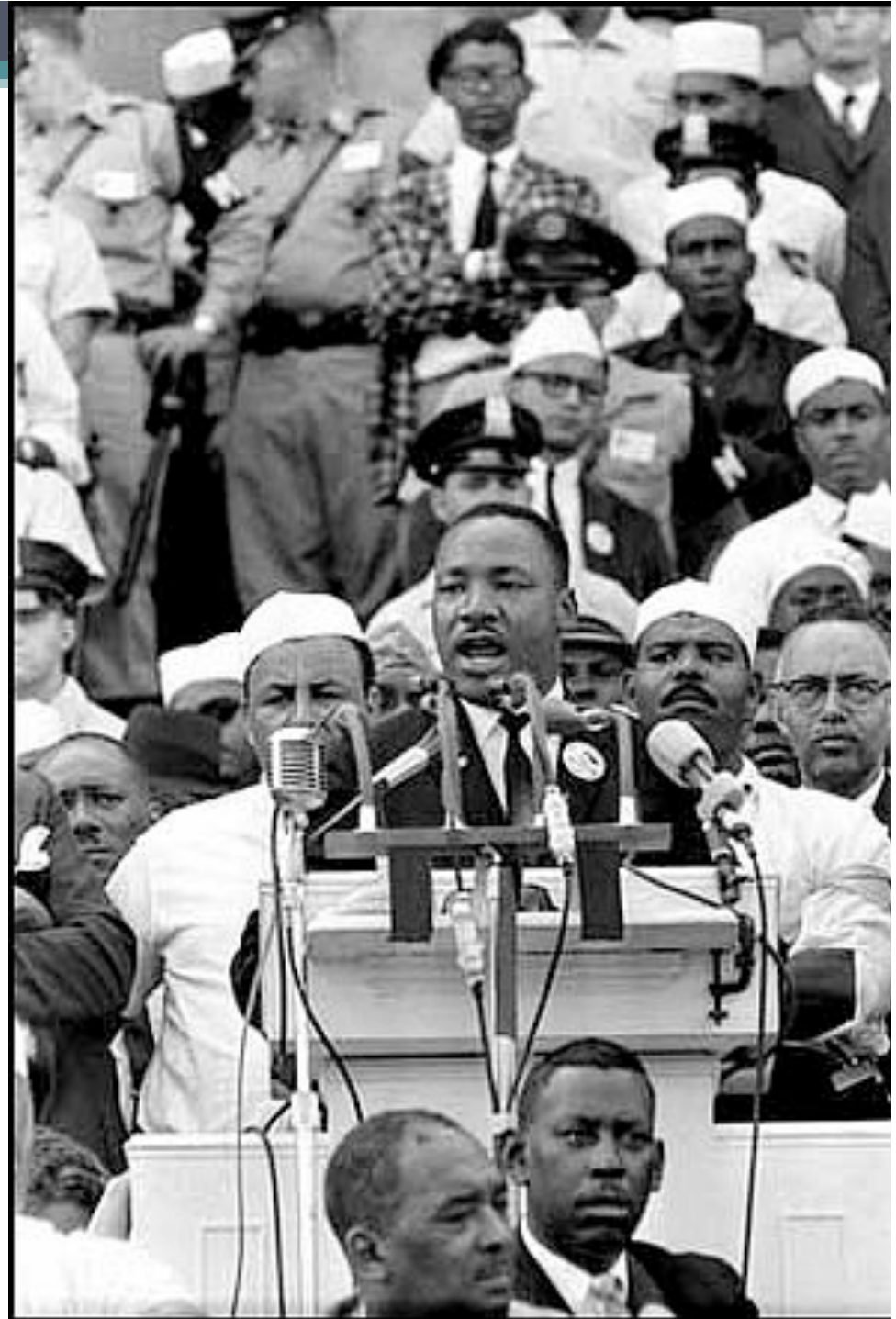
- Yes ! But - so far - mainly
  - distributed working environment
  - new and faster access channels
  - ...
- Scientific knowledge processes are still based on the traditional notion of “paper” publication and on peer review as quality assessment method
  - *Philosophical Transactions of the Royal Society of London—founded in 1665*
  - *Journal des savans— 1665*
  - *Royal Society of Edinburgh’s Medical Essays and Observations, - 1731, introduces peer review as we would recognise it today*

# We have a dream

*Explore a real change of **paradigm**, culture and style of scientific production processes*

*Capture the lessons learned by the Web and open source, agile development to develop concepts, models, metrics, and tools for an efficient (**for people**), effective (**for science**), sustainable (**for publishers and the community**) way of **creating, disseminating, evaluating, and consuming** scientific knowledge.*

From. [www.52en.com/img/dream\\_01.jpg](http://www.52en.com/img/dream_01.jpg)





# Open Source Science What is it?

- „Science“ („Research“)
  - Advancing state-of-the-art of human knowledge
  - Vs. Engineering (building a working solution)
  - Vs. Innovation (bringing promising ideas to market)



# Open Source Science. What is it?

- „Open“
  - Science as a “Common”
    - scientific results belongs to everybody
    - when results are paid by the whole community, they have to be shared and kept in a common space
    - not limited to Open Access / Open Science
  - Transparent processes
    - Common, agreed agenda – no hidden, private agenda
    - Open evaluation processes



# Open Source Science. What is it?

- „Open Source“
  - “*I consider that the golden rule requires that if I like a program I must share its code with other people who like it and want to use it (Richard Stallman, 1983)*”
  - Not only „papers“
    - **sharing** artifacts (raw data, images, maps, videos, benchmarks, methods, toolkits, prototypes, infrastructures, ...)
  - Collaborative, community-driven approach
    - **e-Science** initiatives
    - new way of creating, extracting and evaluating scientific work that mixes the expertise of the few with the “wisdom of the many”
  - New ownership and credit attribution models



A large number of technologies are out there



## Blogs



## Wikis



## Collaborative tagging and social bookmarking



## Scientific Search Services



## Journals with collaborative peer review processes



## Complex Systems





# But how they can be effectively used ?

Let's explore some dimensions of the issue

- Notion of “scientific contribution” and unit of dissemination
- Agile and Open Source “scientific” processes
- “Virtuous” metrics and efficient evaluation

# Notion of “scientific contribution” and unit of dissemination

- In the past: papers
- What has been the function of the scientific paper?
  - The minimal scientific unit in which an idea or a result can be intelligibly expressed and evaluated
  - A rhetoric device that serves communication and pedagogical functions



# Notion of “scientific contribution” and unit of dissemination

- However, many new things can be considered as contributions
  - Reviews, Comments, Blogs
  - Experiments, data
  - Prototypes, artifacts
- So the challenge is how to make them first class citizens in science (measure, search, disseminate....)
  - Define the new rhetorical models
  - How to reference them
  - How to evolve them



# Agile and Open Source Development

- Scientific content generation and dissemination has mainly followed a “waterfall model”

Today we have new possibilities:

- Evolving, always in beta (liquid documents), with snapshots (solid documents)
- Incremental works are ok but should be recognized as such
- Errors and error corrections are also ok.
- Collaborative model : share early – in controlled fashion
- Continuous dissemination





# Agile and Open Source Development

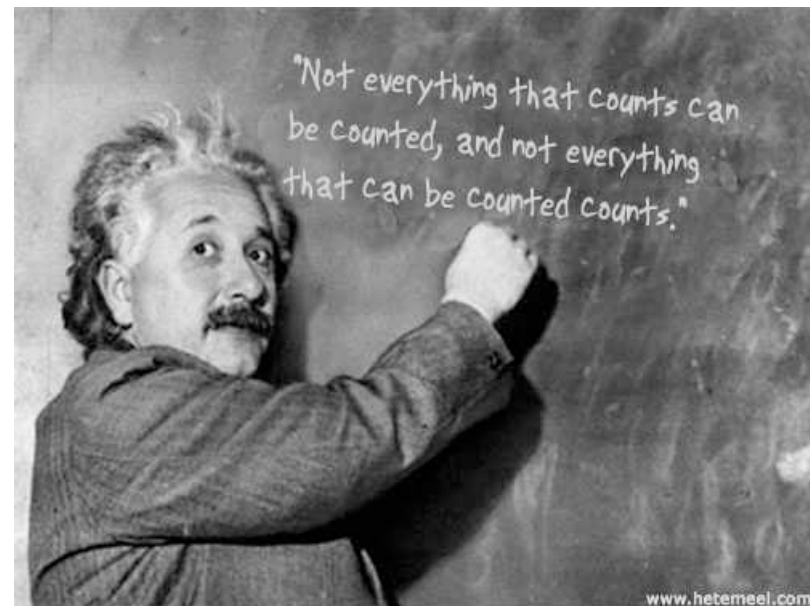
What do we need ?

- Support definition and creation of “liquid” scientific contribution and their lifecycles
- Support tracing, support ownership, licensing, access right models
- Distributed and efficient search and navigation
- Challenges:
  - **Usability, Light overhead**



# “virtuous” metrics and efficient evaluation

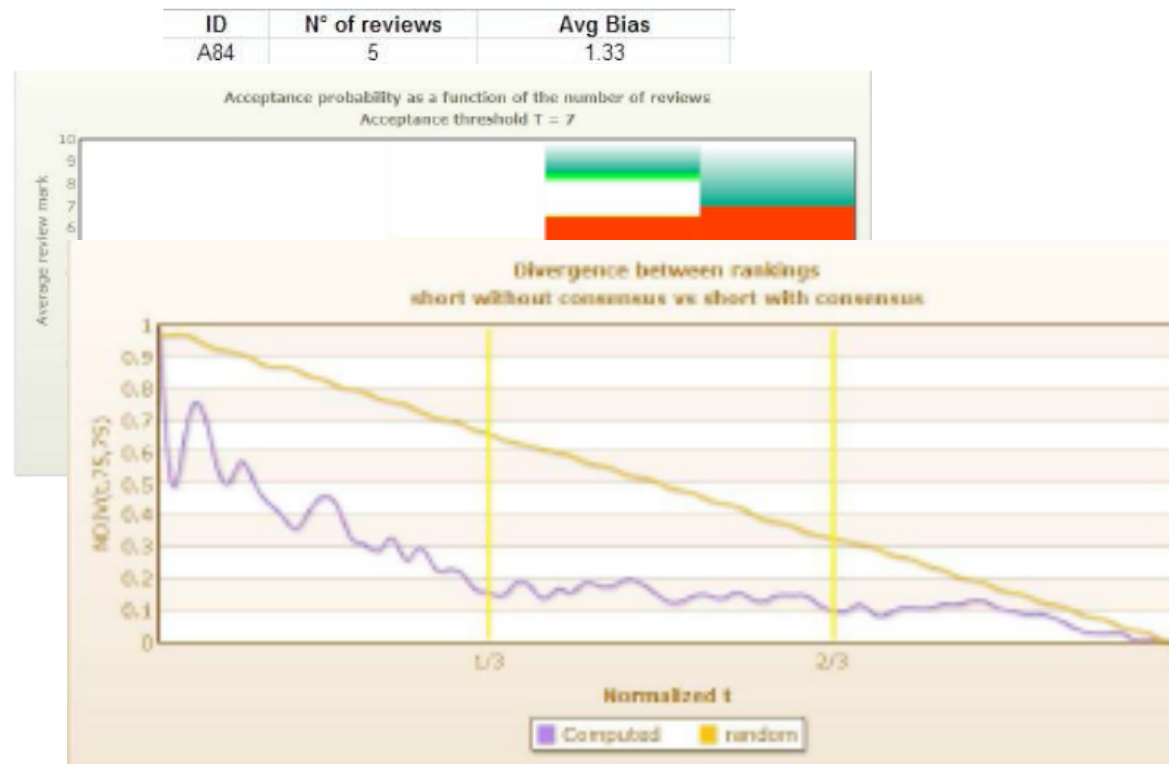
- metrics that take into account all different kinds of contributions.
  - bookmarking, forwarding,
  - Liquid Journals
- More fair and efficient peer review process
- Transparent metrics



*“Not everything that can be counted counts, and not everything that counts can be counted.” -- Albert Einstein*

# Open / Trasparent Review Processes

- Monitor and report
  - Fairness
  - Efficiency
  - Quality





# project.liquidpub.org

The screenshot displays the LiquidPub project website interface. At the top, a blue navigation bar includes the LiquidPub logo, a search bar, and links for 'Logout [Fabio Casati]', 'Settings', 'Help', and 'Leave Feedback'. Below this, a grey bar highlights 'My Lifecycles'. The main content area is divided into two panels. The left panel, titled 'Instances | Templates | Updates', shows a workflow diagram with a 'New Instance' button and a 'Share' button. The diagram includes a 'LiquidPub SotA deliverable' box, a '2' in a circle, and a flow from 'Elaboration' to 'Internal Review'. Below the diagram, it says 'Next phase: Elaboration' and 'Notify collaborators Collaborators'. The right panel, titled 'Community Map', shows a network diagram with nodes like 'Programming', 'Languages', 'Requirements', 'Design', 'Data Mgt.', 'Information', 'Knowledge', 'Mapping', 'Representation', 'Schemas', 'Databases', 'Mining', 'Data Mgt.', 'Information', 'Web', 'Semantic', 'Processes', 'Services', 'Discovery', and 'Architecture'. Below the map, an 'Updates' section shows a message: 'Pippo shared a file with dbTrentoView'. The footer contains copyright information: 'Copyright © LiquidPub Project | Layout based on YAMIL | Some icons from famfamfam "Silk Icons" collection'.

Logout [Fabio Casati] | Settings | Help | Leave Feedback

LiquidPub

Search

My Lifecycles

Instances | Templates | Updates

My metrics

H-INDEX 27

G-INDEX 53

+ New Instance

Elaboration

Write the index regarding to evaluation

» Share » Export » View trace

LiquidPub SotA deliverable

2

Elaboration

Internal Review

\* Click on the phase to perform the transition

Next phase: Elaboration

• Notify collaborators Collaborators

Community Map

Programming

Languages

Requirements

Design

Data Mgt.

Information

Knowledge

Mapping

Representation

Schemas

Databases

Mining

Web

Semantic

Processes

Services

Discovery

Architecture

Updates

• Pippo shared a file with dbTrentoView

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# How to make it happen

- Understand culture first
  - Different disciplines have different (scientific, engineering, innovation) cultures
  - Devise a discipline-specific approach
- Have focused objectives
  - „Controlled experimentation“
  - Maintain an holistic approach: technological, metodological, legal, economic
- The Web matters
  - as technology
  - as (social/scientific) collaboration platform



Thank you

# Agile and Open Source Development

Many ICT tools available

- Version Control System
- CSCW Tools
- Web 2.0 Collaboration Tools

In progress

- Software prj mgm -> scientific artifact mgm
- Process workflow -> Scientific processes workflow

