

Revolutionizing scientific communication and collaboration

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Allen Press Emerging Trends in Scholarly Publishing Seminar

Washington, USA

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Motivation

Communication is essential for science

- Exchange inside the scientific community
 - Science is built on the previously done work
 - Avoid redundancy – do not invent the wheel twice
 - Find collaborations
 - Get inspiration
- Make knowledge available for the general public



Motivation

Scientific communication and *Web 2.0*

- New web technologies dubbed as *Web 2.0* make communication and collaboration cheaper, easier, faster and decentralized.
- They are complementary to current scientific communication but might become a substitution for those classical channels.



We are just at the beginning

I find it ironic that science is about the adoption, discovery and exploitation of new knowledge and techniques, yet the biggest revolution on the web is passing us by.

Greg Tyrelle (*Nature*, 1 December 2005, 438, 548-549)

Scientists are more interested in their careers and grants than using tools that promote better communication and data sharing.

David Lipman

“He’s optimistic that this attitude may change in the future, however, especially as a new generation used to communicating through social sites such as MySpace enters research.”

(*Nature*, 1 March 2007, 446, 10-11)

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There is so much to talk about ...



Pg



HubMed: pubmed reired



... but I will focus on two topics.

Wikis – Knowledge management made easy

What's a wiki

- *wiki wiki* – hawaiian for *quick*
- When Tim Berners-Lee invented the WWW he thought about a web everybody can edit - wikis are exactly that
- Create/change/delete web pages online
- All versions are kept and can be recovered/compared
- Contributions of users can be determined



Wiki features – Viewing a document

The screenshot shows the Wikipedia article for 'Metagenomics'. The browser address bar displays 'http://en.wikipedia.org/wiki/Metagenomics'. The page title is 'Metagenomics' with a subtitle 'From Wikipedia, the free encyclopedia'. The article text states: 'Metagenomics (also **Environmental Genomics**, **Ecogenomics** or **Community Genomics**) is the study of genomes recovered from environmental samples as opposed to from *isolated cultures*.' Below the text is a 'Contents' table of contents with sections like 'History', 'Sequences from environmental samples', and 'Community metabolism'. A 'History' section follows, detailing the field's origins with Nerman R. Pace and colleagues in 1985 and 1991.

Wikipedia logo: **WIKIPEDIA**
The Free Encyclopedia

Navigation: Main page, Contents, Featured content, Current events, Random article

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in other languages: [日本語](#)

article | discussion | edit this page | history

Your *continued donations* keep Wikipedia running!

Metagenomics

From Wikipedia, the free encyclopedia

Metagenomics (also **Environmental Genomics**, **Ecogenomics** or **Community Genomics**) is the study of genomes recovered from environmental samples as opposed to from *isolated cultures*.

Contents [hide]

- History
- Sequences from environmental samples
- Community metabolism
- Inferences
 - 1 Review articles
 - 2 Methods
 - 3 Bioinformatics
 - 4 Marine ecosystems
 - 5 Sediments
 - 6 Extreme environments
 - 7 Medical Sequences and biotechnological applications
 - 8 Patents
- External links

History

This relatively new field of *genetic* research allows the genomic study of organisms that are not easily cultured in a laboratory. Early molecular work in the field was conducted by **Nerman R. Pace** and colleagues, who used PCR to explore the diversity of ribosomal RNA sequences from organisms present in uncultured environmental samples. Considerable efforts ensured that these were not PCR false positives and supported the existence of a complex community of unexplored species. Although this methodology was limited to exploring highly conserved, non-protein coding genes, it did support early microbial morphology-based observations that diversity was far more complex than was known by culturing methods.

The insights gained from these breakthrough studies led Pace to propose the idea of cloning DNA directly from environmental samples as early as 1985 (ASM News 51.4). This led to the first report of isolating and cloning bulk DNA from an environmental sample, published by Pace and colleagues in 1991 (J. Bacteriol. 173: 4371) while Pace

Wiki features – History of versions

W Metagenomics - W Editing Metageno... W **Metagenomics...** W Metagenomics... W Talk:Metagenomi...

article discussion edit this page history

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Metagenomics

From Wikipedia, the free encyclopedia

Revisions History
View logs for this page

(Latest | Earliest) View (previous 50) (next 50) (20 | 50 | 100 | 250 | 500)

For any version listed below, click on its date to view it.
For more help, see [Help:Page history](#) and [Help:Edit summary](#).

(cur) ← difference from current version, (last) ← difference from preceding version.
b = [bot edit](#), m = [minor edit](#), == = [section edit](#), - = [automatic edit summary](#)

[Compare selected versions](#)

- » (cur) (last) ^o 15:33, 3 April 2007 PMaster3 (Talk | contribs) m
- » (cur) (last) 15:52, 1 April 2007 75.26.23.16 (Talk) (-Review article)
- » (cur) (last) 20:18, 27 March 2007 [Saksham](#) (Talk | contribs) (-Inquireize from environmental samples - added reference to bacteriophages including Wiki link)
- » (cur) (last) 22:45, 14 March 2007 146.351.192.120 (Talk) (-Extreme environments)
- » (cur) (last) 19:21, 14 March 2007 Konrad Frenstrier (Talk | contribs) (-Marine ecosystems -- Added Global Ocean Sampling expedition papers)
- » (cur) (last) 17:07, 14 March 2007 Shayno (Talk | contribs) (Added link to FLOs Biol article)
- » (cur) (last) 20:54, 21 February 2007 Rajah (Talk | contribs) m (-Feral/miss)
- » (cur) (last) 20:53, 21 February 2007 Rajah (Talk | contribs) (-external link - link to list of Metagenome Projects)
- » (cur) (last) 09:35, 21 February 2007 68.127.169.234 (Talk) (-External link)
- » (cur) (last) 09:34, 21 February 2007 68.127.169.234 (Talk) (-External link)
- » (cur) (last) 01:35, 10 February 2007 CmdrObot (Talk | contribs) m (sp: colleagues-colleagues)
- » (cur) (last) 02:14, 22 January 2007 68.127.176.233 (Talk) (-External link)
- » (cur) (last) 21:41, 20 January 2007 Daniel Vauoit (Talk | contribs) m (-History - correct reference)
- » (cur) (last) 18:32, 20 January 2007 Daniel Vauoit (Talk | contribs) (-References - include many new references and organize references by environments)
- » (cur) (last) 13:08, 20 January 2007 Daniel Vauoit (Talk | contribs) (↓. Create history heading at top 2.

Navigation sidebar:

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Wiki features – Comparing versions

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Metagenomics

From Wikipedia, the free encyclopedia
([Difference between revisions](#))

Revision as of 22:45, 14 March 2007 (edit)
146.151.192.120 (Talk)
(←[Earlier versions](#))
– Older edit

Line 16:
Conventional [\[\[sequencing\]\]](#) begins with a culture of identical cells as a source of [\[\[DNA\]\]](#). However early metagenomic studies revealed that there are probably large groups of microorganisms in many environments that cannot be cultured and thus cannot be sequenced. These early studies focused on 16S [\[\[ribosomal\]\]](#) [\[\[rRNA\]\]](#) sequences which are relatively short, often conserved within a species, and generally different between species. Many 16S [\[\[rRNA\]\]](#) sequences have been found which do not belong to any known cultured species, indicating that there are numerous uncultured organisms out there.

Recovery of DNA sequences longer than a few thousand base pairs from environmental samples was very difficult until recent advances in molecular biological techniques, particularly related to constructing libraries in bacterial artificial chromosomes (BACs), provided better vectors for molecular cloning. In addition, advances in [\[\[bioinformatics\]\]](#), refinements of DNA amplification, and proliferation of computational power have greatly aided the analysis of DNA sequences recovered from

Revision as of 20:18, 27 March 2007 (edit)
(undo)
Sahiboo (Talk | contribs)
(←[Sequence from environmental samples](#) - *added reference to bacteriophages including Wiki link*)
Newer edit –

Line 16:
Conventional [\[\[sequencing\]\]](#) begins with a culture of identical cells as a source of [\[\[DNA\]\]](#). However early metagenomic studies revealed that there are probably large groups of microorganisms in many environments that cannot be cultured and thus cannot be sequenced. These early studies focused on 16S [\[\[ribosomal\]\]](#) [\[\[rRNA\]\]](#) sequences which are relatively short, often conserved within a species, and generally different between species. Many 16S [\[\[rRNA\]\]](#) sequences have been found which do not belong to any known cultured species, indicating that there are numerous uncultured organisms out there.

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- Cite this article

in other languages:

- [日本語](#)

Wiki features – Discussion

The screenshot shows a web browser window displaying the Wikipedia Talk page for "Metagenomics". The browser's address bar shows the URL "http://en.wikipedia.org/wiki/Talk:Metagenomics". The page has several tabs open, including "Metagenomics" and "Talk:Metagen...". The main content area is titled "Talk:Metagenomics" and includes a sub-header "From Wikipedia, the free encyclopedia". The page contains a discussion thread with several paragraphs of text and a signature. The left sidebar contains navigation and interaction links. The bottom of the page features a footer with copyright information and a Creative Commons license.

W Metagenomics - W Editing Metageno... W Metagenomics - W Metagenomics - W Talk:Metagen...

article discussion edit this page history

Sign in / create account

Your *continued donations* keep Wikipedia running!

Talk:Metagenomics

From Wikipedia, the free encyclopedia

I think the subject also need some comments the study of organisms acting as a community. An example being the flow of a metabolite through the different metabolisms. Any thoughts? Or Perhaps that comes under systems biology instead?

It does include an aspect of studying an entire community at a genetic level

I'd say yes and no to this. Following a metabolite through different metabolisms would fall under something like systems biology and might not require any genomic information at all so metagenomics might not be the right label. Such studies are also not the sole concern of metagenomics. Diversity and evolution are also concerns in the field.

On the other hand, such a study is one of the really useful things that metagenomics can do and do well and probably what a lot of people in the field are doing, so it definitely deserves a prominent mention if not is own section. It's just not what I'm doing in metagenomics, so I didn't think to put it in.

Also, just because I started the page page, doesn't mean you can't add what you'd like to it. If you have some knowledge or interest in this area, please contribute. jmeppley 21:05, 25 Jan 2005 (UTC)

Diversa Corporation

Obviously someone closely with Diversa Corporation has edited this piece. Metagenomict is obviously not only Diversa Corporation !!! I removed Press releases and all mentions to Diversa Corporation in the references. More editing is needed

—Daniel Vauclot 13:10, 20 January 2007 (UTC)

search

Go Search

toolbox

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Applications of wikis

Collaborative organising/writing of ...

- ... all kinds of knowledge (Wikipedia)
- ... books (Wikibooks)
- ... labs/collaborations
- ... communities/projects
- ... documentations/manuals/how-tos
- ... conferences (barcamps)
- ... documents like papers, grants, patents, business plans etc.
- ... do I have to go on?



OpenWetWare – Sharing life science lab information



The screenshot shows the OpenWetWare Main Page in a web browser. The browser's address bar displays the URL `http://openwetware.org/wiki/Main_Page`. The page features a navigation menu at the top with links for `article`, `chat`, `discussion`, `view source`, and `history`. A large DNA double helix graphic is positioned on the left side of the page. The main content area is titled "Main Page" and prominently displays the "OPEN WETWARE" logo. Below the logo, a text box explains that OpenWetWare is an effort to promote the sharing of information, know-how, and wisdom among researchers and groups in biology and biological engineering. It includes a call to action for users to join or edit the site. A central grid of icons provides quick access to various sections: "About Us", "Getting Started", "Resources", "Community", "Labs", "Protocols", "Courses", and "Groups". Below this grid, a "News Highlights" section features four items: "We're Hiring! Apply Now", "BioSysBio 2007 Conference", "Video Highlight Crisanti Lab", and "Lab Highlight Christopoulos Lab". The "Media Spotlight" section contains a circular logo with a DNA helix and the text "OPENWETWARE". The "What's New" section lists recent events, including steering committee meetings and a wiki chat.

http://openwetware.org/wiki/Main_Page

article chat discussion view source history

Main Page



OpenWetWare is an effort to promote the sharing of information, know-how, and wisdom among researchers and groups who are working in biology & biological engineering. Learn more about us [here](#).
If you would like edit access, would be interested in helping out, or want your lab website hosted on OpenWetWare, please [join us](#).

 About Us Learn more about us	 Getting Started Step-by-step tutorial	 Resources Useful links & tools	 Community How you can help
 Labs From around the world	 Protocols Share techniques & more	 Courses HOST & view classes	 Groups HOST & view organizations

News Highlights

 We're Hiring! Apply Now	 BioSysBio 2007 Conference	 Video Highlight Crisanti Lab	 Lab Highlight Christopoulos Lab
---	---	--	---

Media Spotlight



What's New

- 4/4: Steering committee meeting
Call in or add items to the agenda.
- 3/9: Wiki Chat
You can now chat on the wiki!
- 2/7: OpenWetWare data dumps
Download full backup of OpenWetWare.
- 1/18: Steering committee meeting
Call in or add items to the agenda.
- 1/20: OpenWetWare welcome to...

Navigation icons: back, forward, search, etc.

Plastics Wiki – Information about plastic science

http://plastics.inwiki.org/Main_Page

article | discussion | view source | history

Main Page


Welcome to Plastics Wiki,
the free plasticopedia that anyone can edit.
1,297 articles in English

- processing
- materials
- suppliers
- industry
- products
- personalities
- equipment
- additives
- manufacturers

Processing

Plastics Molding

The



forming of a resin/fiber material into a solid mass of prescribed shape and size

- injection molding IM
- Compression molding CM
- Transfer molding TM
- Extrusion molding EM
- Blow molding BM
- Rotational molding RM
- Laminating LM
- Foam molding FM
- Rotomolding RM
- Vacuum plug assist molding VPAM
- Pressure plug assist molding PPAM

Plastic Thermoforming

Forming a thermoplastic sheet into a 3D shape by clamping and heating it to tender it soft.

- Vacuum forming
- Free blowing
- drape forming
- free blowing
- sheet bending

Plastic Extrusion

continuous process of melting a plastic material and forcing it through an orifice.

- Sheet Extrusion
- Profile Extrusion
- Pipe extrusion
- Blown Film Extrusion
- Cast Film Extrusion
- Foam Extrusion

Materials

Thermoplastics

- Acrylonitrile butadiene styrene (ABS)
- Acrylic
- Celluloid
- Cellulose acetate
- Ethylene-Vinyl Acetate (EVA)
- Ethylene vinyl alcohol (EVAL)
- Fluoroplastics (FE)
- ionomers
- Liquid Crystal Polymer (LCP)
- Polyacetal (POM or Acetal)
- Polycarbonates (Acrylic)
- Polyacrylonitrile (PAN or Acrylonitrile)
- Polyamide (PA or Nylon)
- Polyamide-imide
- Polycarbonate (PC)
- Polyketone (PK)
- Polyester
- Polyethylene
- Polyetheretherketone (PEEK)
- Polyetheramide (PEI)
- Polyethersulfone (PES)- see Polysulfone
- Polyethylenechlorotrifluorene (PCC)
- Polyimide (PI)
- Polylactic acid (PLA)
- Polyimathyphentone (PMP)
- polyphenylene oxide (PPO)
- Polyphenylene sulfide (PPS)
- Polyphthalamide (PPA)
- Polypropylene (PP)
- Polystyrene (PS)
- Polysulfone (PSU)
- Polyvinyl chloride (PVC)

navigation

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topics

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in other languages

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WikiProteins – A semantic web wiki for protein annotation

http://www.wikiprofessional.info/

Wiki Proteins
Knowledge at a glance

"Real-time community annotation can play an important role in updating protein records." Prof. Anoushirroodi

"This is the first time that Wiki technology and semantic technology are combined for scientific purposes." Prof. Michael Robinson

"I welcome this initiative because it enables investigators to collaborate in an open environment." Prof. Mark Blumberg

UniProt

As cited in Nature News...

WikiProteins is the first Wiki Professional serving scientists working on biology and disease.

What's next?

- WikiSubcell
- WikiChemical
- WikiClinical
- and... Any WikiProfessional of your choice

Witness the first semantic web application on the Semantic Web enabling real-time knowledge exchange and expansion

Demonstration

Click the button below to enter the demo

view demo

Keep me informed

First name:

Last name:

E-mail address:

keep me informed

This string has been escaped (HTML)

Potentials and Challenges

To solve/consider

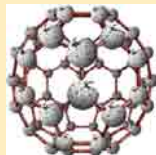
- Quality
- Motivate people / critical mass
- References
- Identity vs. Privacy
- Credits
- Licenses



Potentials and Challenges

Future

- More Semantic Web under the hood (“web of data”)
- More functionality (e.g. mind mapping)
- Wiki-Science as proposed by Kevin Kelly
 - “Paper” as wiki
 - Constantly improving
 - Many contributors
 - *Wiki-science will often be the first word on a new area. Some researchers will specialize in refining ideas first proposed by wiki-science.*



Online conferences

Why?

Talks/Conferences are an excellent way of communicating science, but usually reach only a small audience.

Advantages of online conferences

- Broader audience can be reached
- Cheaper
- Fewer time restrictions
- Save fuel and avoid CO₂-emissions

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An example - First Online EMBL PhD Symposium

http://onlinesymposium.predocs.org/

Welcome t... Media --- Fis... Roland Krau... Discussion a... Participant's... Pedro Betra...

 **First Online EMBL PhD Symposium**
December 4 - 8, 2006
Life Sciences - Shaping the Future

home media chat info about

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Welcome to the First Online EMBL PhD Symposium

Life Sciences - Shaping the Future!

The goal of the First Online EMBL PhD Symposium was to provide a meeting place for the larger audience of people involved in life sciences to discuss the state-of-the-art and perspectives of development. The future of scientific communication itself was also to be discussed. In addition to scientific topics, we invited the participants to our career development forum that helped to shape a better future for scientists by sharing your experiences.

Rather than using a conventional meeting format with formal presentations and rather limited options for interaction between the invited speakers and the participants, we introduced an open internet-based platform for everyone interested to ensure that all opinions were heard. We invited prominent scientists to share their vision on development of life sciences in selected fields in a form of web-based presentations and invited everyone else to further discuss it and present their own views in a similar fashion.

The symposium is over but the content is now available for everybody.

First Online EMBL PhD Symposium

An example - First Online EMBL PhD Symposium

Facts

- Open for 5 days to registered participants; after that media available without restrictions
- Video, audio, presentation files
 - 14 pre-recorded talks
 - 2 pre-recorded interviews
 - 1 panel discussion
 - 1 talk discussion
- Participants could contribute by commenting on talks, in chats and with their own media.
- Implemented using the Plone CMS



Sessions

http://onlinesymposium.predoc.org/media1.html

Welcome to **Media** — F... Roland Krau Discussion 4 Participants Pedro Betra

navigation

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Media

[Up one level](#)

Different audio and video media are waiting for you and your opinions.

[Overview of the speakers](#)

Our external speakers

[Career Development Session](#)

What does it mean to be a scientist? Why would you choose to be a scientist? What are the job possibilities if you think that an occupation in science is yours? These and other questions we would like to address in our Career Development part of the symposium. By offering interesting material from various science experts and different angles we are aiming to highlight the plethora of possibilities that is opening up for everybody who wants to pursue a "career" in science. The term "career development" is related to many myths and promises and we try to uncover the "false hopes" and bring you the reality of working as a scientist a little bit nearer. Among others we are featuring an exclusive interview with Prof. Dr. Tim Hunt who won the Nobel Prize 2001 for his outstanding discoveries of proteins regulating the cell cycle.

[Omics / Systems Biology Session](#)

Life is more than just the sum of its parts. Analyzing all entities of a biological system and their interactions are essential to the understanding of the mechanisms of biology. The computer based integration of many different types of biological experiments can lead to such new insights. In this session we will focus on some examples of systems biology.

[Neurobiology Session](#)

The nervous system is the basis of our emotions, our creativity and our conscious sense of ourselves. Understanding how it functions in order to "repair" it when it is "broken" is an intellectual challenge of the highest order. What is the progress on the molecular basis of mental illness and how can we develop better drugs for neurological disorders are some of the questions tackled in this session.

[Scientific Communication 2.0 Session](#)

How can the internet help you to do science more efficiently? Wikipedia and Google Maps are two prominent results of a quiet web revolution that is currently taking place. This new movement towards sharing and community contribution of knowledge, dubbed "web 2.0", will deeply influence scientific communication and science in general - also yours.


[Participant's Contributions](#)

[Advertising Media](#)

Talks

http://onlinesymposium.predocs.org/media/omics-session/roland-kr... | Text: error all

Welcome to | Media | Files | Roland Kr... | Discussion | Participants | Pedro Betra



First Online EMBL PhD Symposium

December 4 - 6, 2006

Life Sciences - Shaping the Future

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Roland Krause - Shared components of protein complexes

Via one level

Recorded exclusively for the Online Symposium, this screencast reports about protein complexes and the trickiness of catching them correctly. Roland Krause, group leader at the Max-Planck-Institute in Berlin, will be online in the chat on Wednesday to answer your questions.

[Information and Discussion](#)

[Video .mov](#)
27 MB

[Video .avi](#)
32 MB

[Audio .ogg](#)
12 MB

[Audio .mp3](#)
22 MB

[Presentation .pdf](#)
1.7 MB

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Poster session

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Pedro Beltrao - Modularity and Evolvability

This is a short presentation on modularity and evolvability in different evolving systems. It tries to argue for more transparent and modular scientific process.

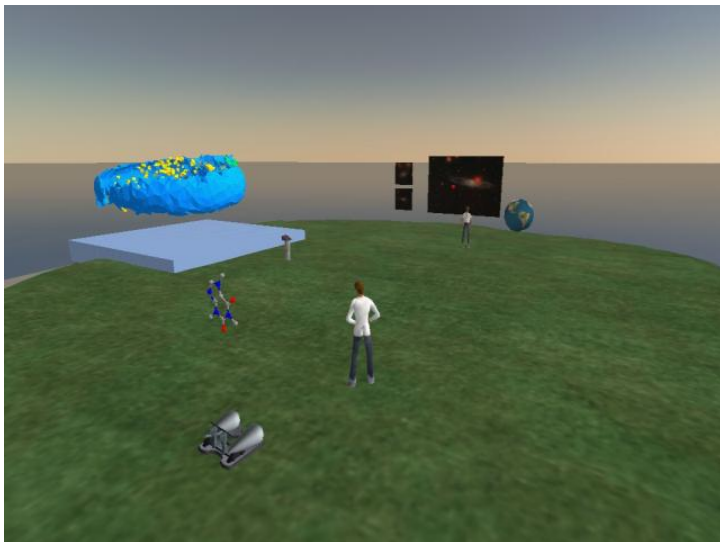
Modularity and evolvability

Cells
Language
Software
Scientific process

Pedro Beltrao
<http://pbeltrao.blogspot.com>


 Creative Commons Attribution-ShareAlike 2.5

Wine and Cheese session



Hanging out at *Nature's* Second Life island *Second Nature*

Lessons learned

- Hard to find people willing to give a talk
 - uncomfortable with the high accessibility (esp. for unpublished data).
 - Too techy?
 - No free trip
 - Many participants but most were passive
 - Very positive feedback from participants
- ⇒ Makes sense if you want to reach many people
- ⇒ Maybe use a hybrid approach



Alternative approaches

If you want to do this with less hassle

- Use (free) hosted web services
 - Blog
 - Video/Audio/Slide sharing platforms
 - IRC/XMPP server
 - Disadvantage
 - less customizable
 - not everything under one roof
- May be soon included in social network software



Take home messages

- Web 2.0 has a deep impact on scientific communication and collaboration
- Wikis are excellent for collaborative work
- Online conferences are a cheap way to reach a broad audience
- To solve/consider: manpower, quality, identity, credits
- Future: More functions and semantic web technologies used

Thanks for your attention.

Any questions?

The presentation slides are available on my web site:

<http://konrad.foerstner.org>

References and Sources

Reference

<http://wikipedia.org>
[http://en.wikipedia.org/wiki/RSS_\(file_format\)](http://en.wikipedia.org/wiki/RSS_(file_format))
<http://network.nature.com>
<http://www.xing.com>
<http://del.icio.us>
<http://www.hubmed.org>
<http://www.postgenomic.com>
<http://microformats.org>
<http://www.blogger.com>
<http://openwetware.org>
http://plastics.inwiki.org/Main_Page
<http://www.wikiprofessional.info>
http://www.edge.org/3rd_culture/kelly06/kelly06_index.html
<http://onlinesymposium.predocs.org>
<http://plone.org>
http://blogs.nature.com/wp/nascent/2006/10/berkman_second_nature_and_the.html

Image sources

The School of Athens – http://commons.wikimedia.org/wiki/Image:Sanzio.01.Plato_Aristotle.jpg
Spider Web – http://commons.wikimedia.org/wiki/Image:Water_drops_on_spider_web.jpg
Wiki Wiki – <http://commons.wikimedia.org/wiki/Image:WikiWiki.jpg>
Ants – <http://commons.wikimedia.org/wiki/Image:Oecophylla.jpg>
Marmot warning – <http://commons.wikimedia.org/wiki/Image:WarningMarmotAustria.JPG>
Terracota army – http://commons.wikimedia.org/wiki/Image:Xian_guerreros_terracota_detalle.JPG
Japanese Classroom – <http://commons.wikimedia.org/wiki/Image:JapaneseClassroom.jpg>
Hammock – <http://www.flickr.com/photos/emzee/139794246/>
Web2.0 – extended mindcloudmap - <http://flickr.com/photos/kosmar/62381076/>

About this document

Created in \LaTeX using the *beamer* class, pdf \LaTeX and *emacs*.
Gimp and firefox were used to take screen shots of websites.
All these programs run on *OpenBSD*.

<http://www.latex-project.org>
<http://latex-beamer.sourceforge.net>
<http://www.tug.org/applications/pdftex>
<http://www.gnu.org/software/emacs>
<http://www.mozilla.com/en-US/firefox/>
<http://www.gimp.org/>
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