



QLectives: evolving software to support quality

Nigel Gilbert
and the QLectives team

This work was partly supported by the Future and Emerging Technologies Programme (FP7-COSI-ICT) of the European Commission through the project QLectives (grant no.:231200).

COMMON INTERESTS POOLED RESOURCES QUALITY CONTENT

A European project to connect people with common interests and deliver quality content to them



- The vision
- The theory
- The practice
- The future

The vision

The basic idea

- If we give people the right **tools** they will **self-organise** into communities that support their needs
- A common need is to find high quality content for entertainment or professional activities
- We believe communities can be grown around the creation, distribution and recommendation of quality content in given domains
- We aim to implement tools that are fully distributed, requiring no central control or authority

Partners

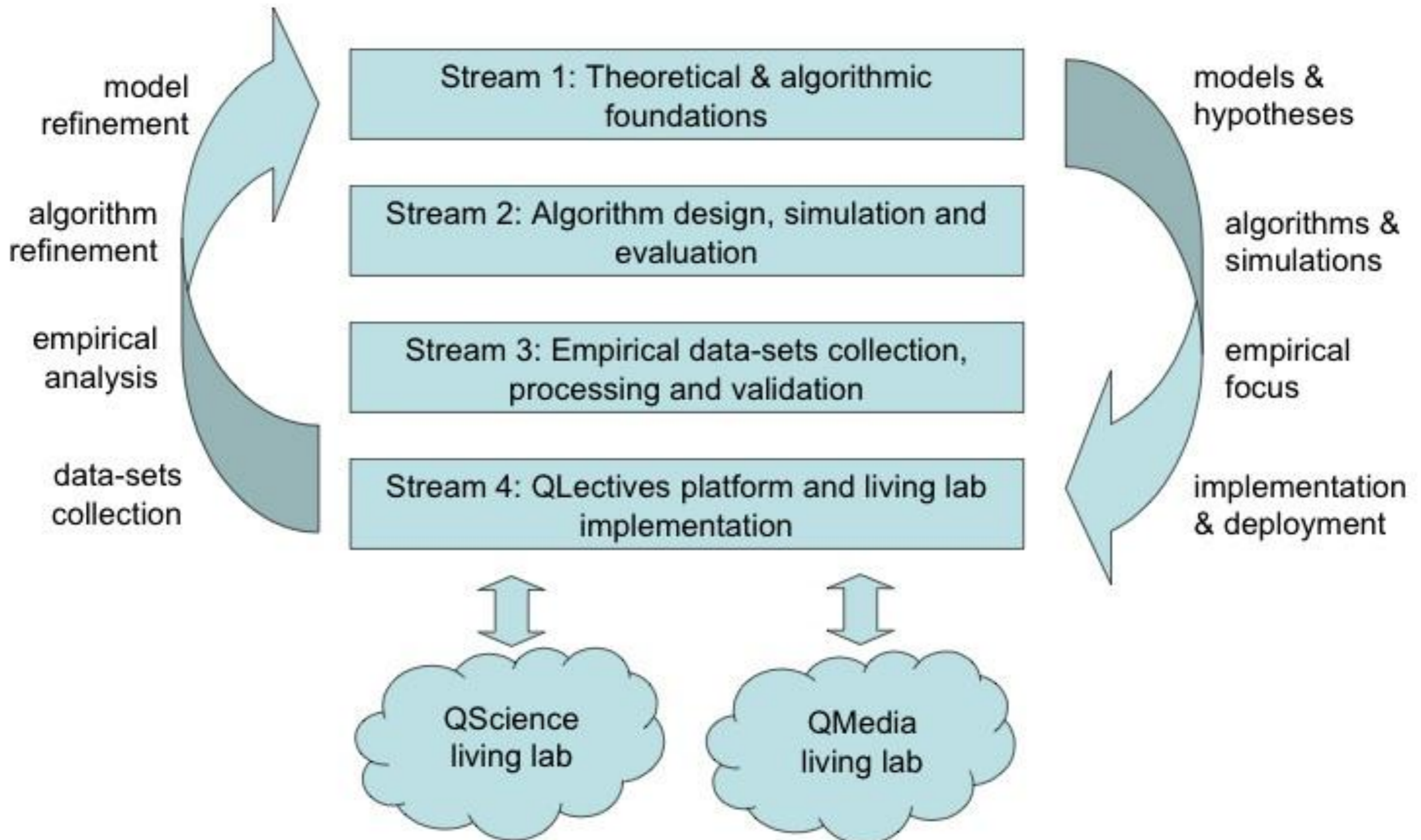
- University of Surrey, UK
 - social modelling
- Technical University of Delft, Netherlands
 - P2P design and deployment engineering
- ETH Zurich (Swiss Federal Institute of Technology), Switzerland
 - social modeling with Physics connotation
- University of Szeged, Hungary
 - P2P and distributed systems algorithm design
- University of Fribourg, Switzerland
 - social modelling with an EconoPhysics approach
- University of Warsaw, Poland
 - social complexity modelling with a Psychological approach
- The Centre National de la Recherche Scientifique, France
 - network analysis
- Institut für Rundfunktechnik GmbH in Munich, Germany
 - metadata, exploitation

- 2009 - 2013

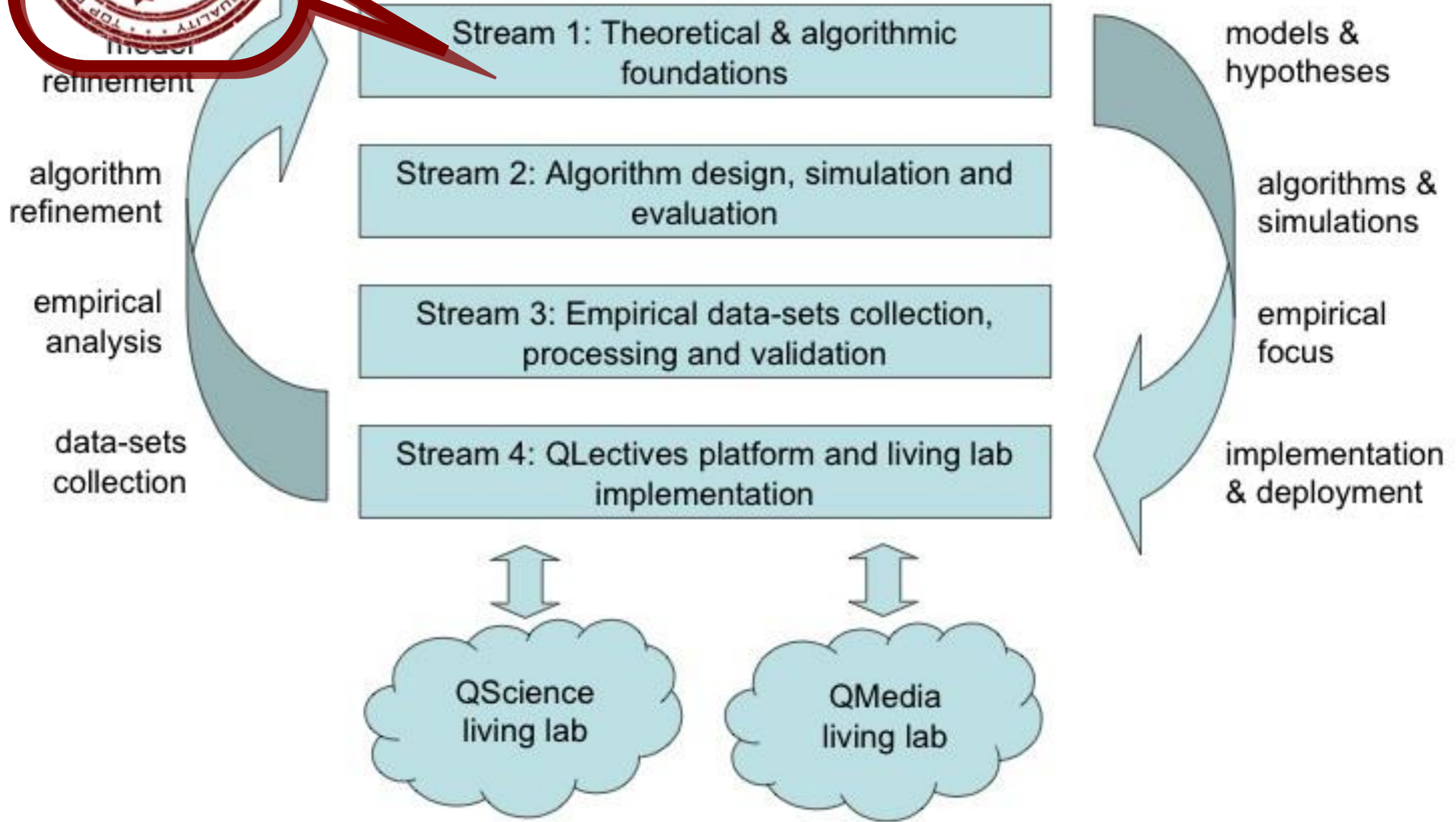
People



Project structure



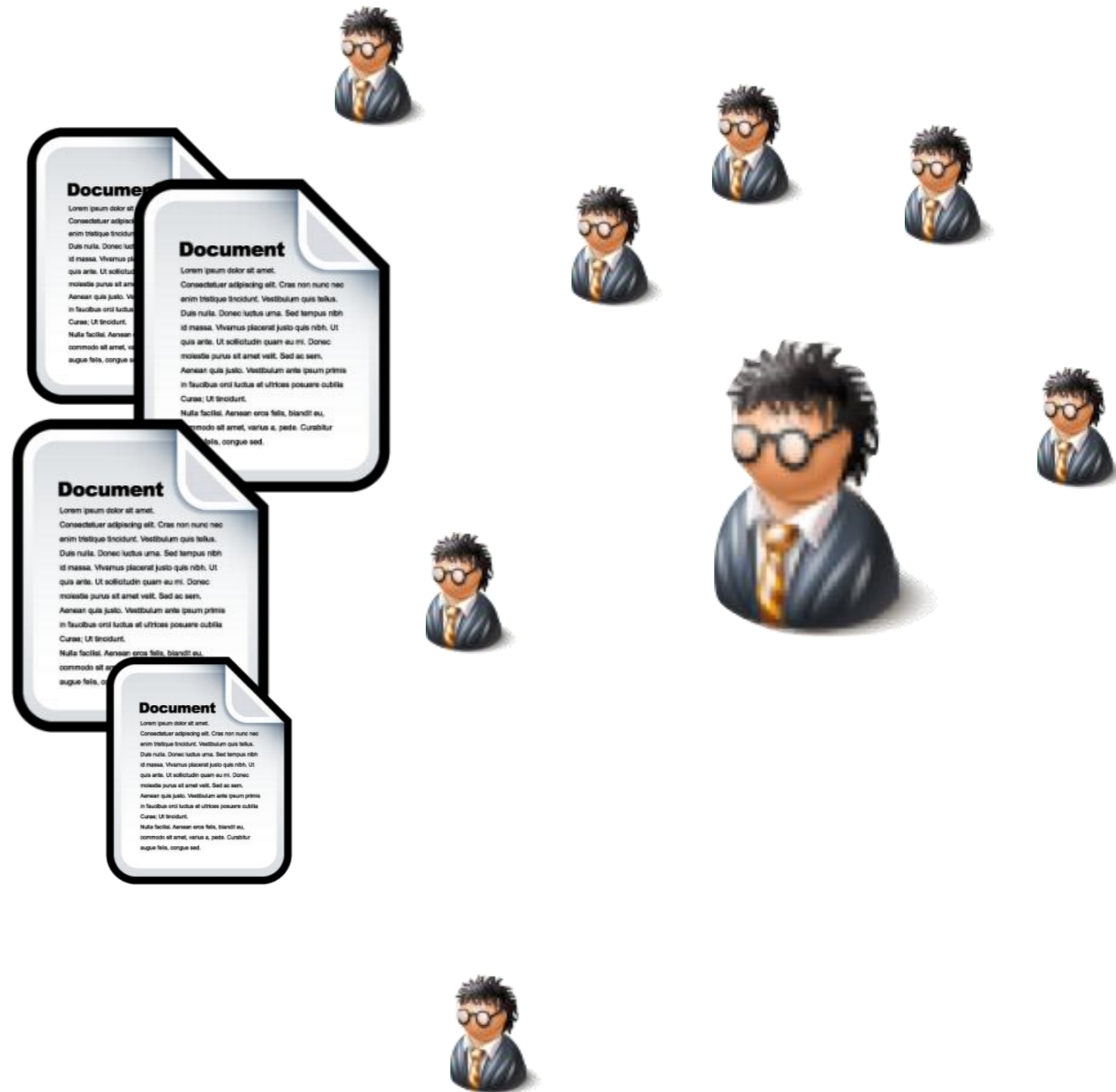
The theory



Quality, trust and reputation



quality is assessed through the opinions of *trusted* others and is the basis of one's *reputation* among peers and the wider community.



Quality is social

- Quality is not an inherent property of an object
 - so not like its colour, for instance
- Quality is ‘constructed’ through interaction with others
 - so there is a process of achieving consensus about the quality of an object (or failing to do so)
 - the same object may have different quality assessments simultaneously
 - different evaluating groups
 - different metrics
 - different objectives

Multiple quality assessments

- The same object may have different quality assessments simultaneously
 - different evaluating groups
 - e.g. wine buffs, alcoholics
 - different metrics
 - e.g. the ‘nose’, percentage alcohol
 - different objectives
 - a pleasurable experience, to get drunk



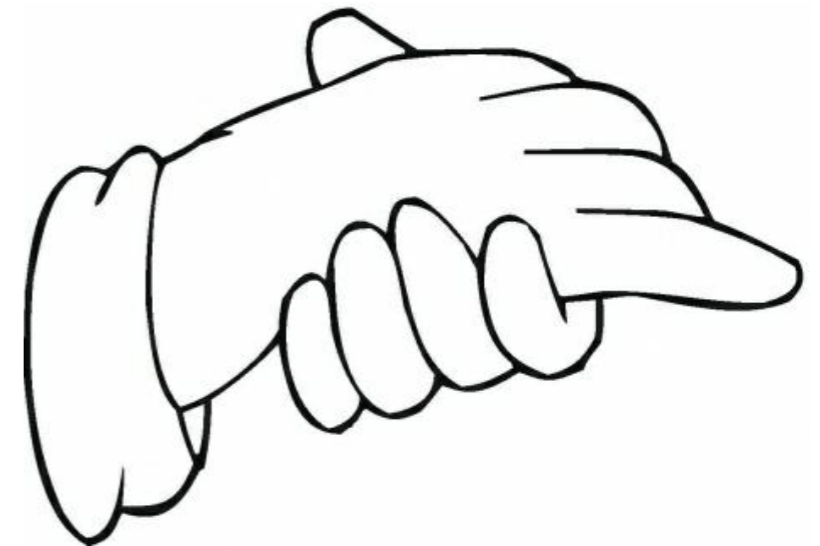
Consequences

- Judgements of quality serve to validate own and others' opinions
- Evaluation is a way of achieving belonging and affiliation with others
- The 'others' are those with similar characteristics
 - so evaluation is a group-reinforcing process:
 - I belong to the group that thinks like me about quality
 - The group consists of those who think similarly about quality
- The evaluations of quality stand as symbols for the group
 - e.g. persian cat fanciers



Trust

- Trust increases with:
 - number of interactions
 - number of successful interactions
 - number of altruistic interactions
 - higher status / reputation of trusted person
 - degree of homophily
 - e.g. same culture, background, discipline, experience
 -
- Trusted others are those whose opinions are valued
 - No trust for those not known



Reputation

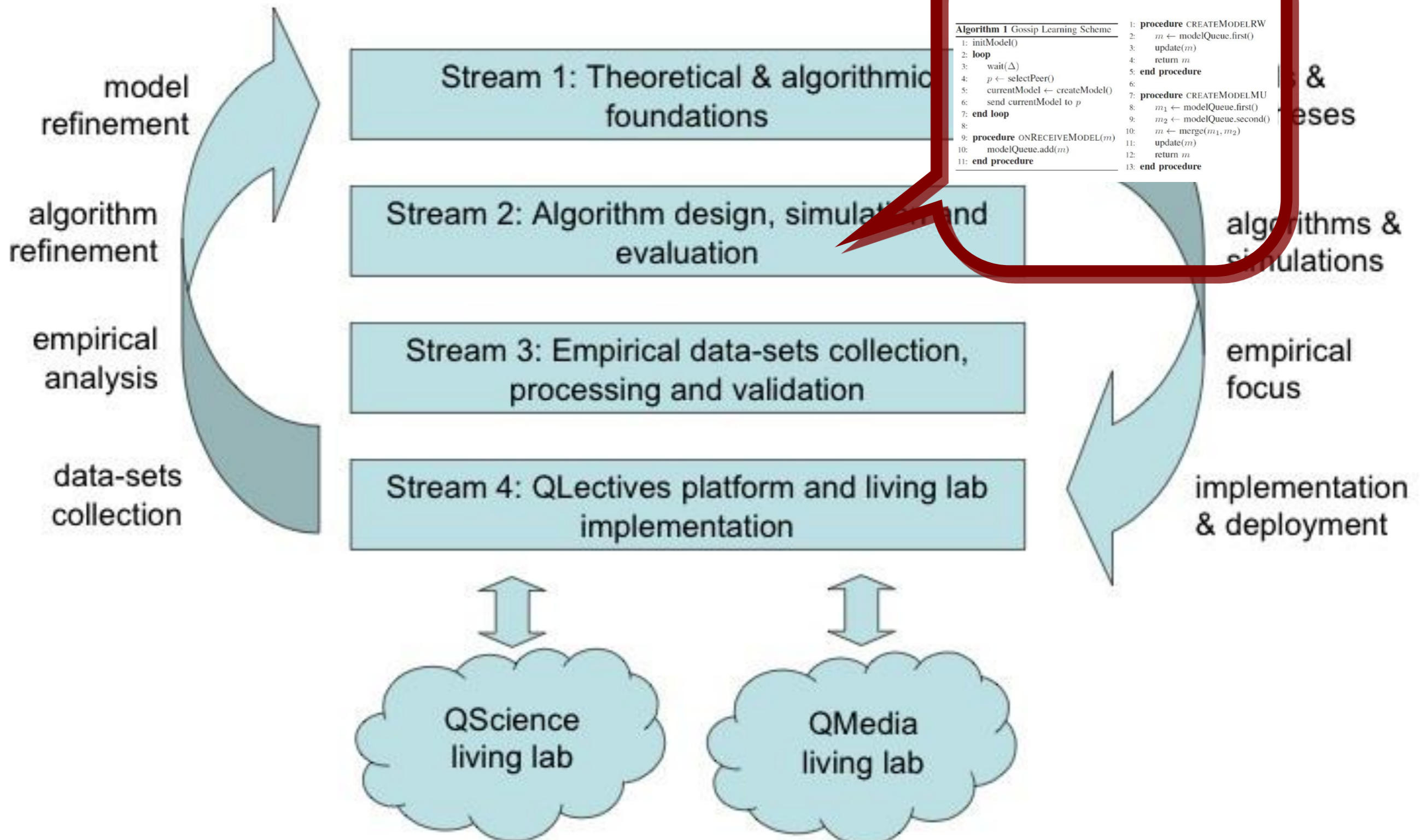
- Ascribed by others
- Assessed on the basis of
 - quality of ego's work
 - trust in ego
 - activity
- Context dependent



How they inter-relate

- Ego's reputation is a function of
 - the aggregation of the quality scores of ego's objects
 - the aggregation of the trust placed in ego by others
- An object's quality score is a function of
 - the aggregation of the quality ratings of everyone who has rated it
 - adjusted by
 - ego's degree of trust in the rater
 - age of rating
- The degree of trust awarded to a person by ego is a function of
 - the distance from ego measured by e.g.
 - the number of links;
 - the number and frequency of interactions
 - that person's reputation

Algorithms

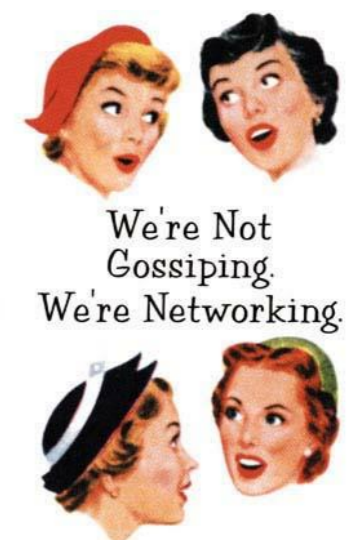


```

Algorithm 1 Gossip Learning Scheme
1: initModel()
2: loop
3:   wait( $\Delta$ )
4:    $p \leftarrow \text{selectPeer}()$ 
5:   currentModel  $\leftarrow \text{createModel}()$ 
6:   send currentModel to  $p$ 
7: end loop
9: procedure ONRECEIVEMODEL( $m$ )
10:  modelQueue.add( $m$ )
11: end procedure
1: procedure CREATEMODELRW
2:   $m \leftarrow \text{modelQueue.first}()$ 
3:  update( $m$ )
4:  return  $m$ 
5: end procedure
7: procedure CREATEMODELMU
8:   $m_1 \leftarrow \text{modelQueue.first}()$ 
9:   $m_2 \leftarrow \text{modelQueue.second}()$ 
10:   $m \leftarrow \text{merge}(m_1, m_2)$ 
11:  update( $m$ )
12:  return  $m$ 
13: end procedure
  
```

Gossip learning framework

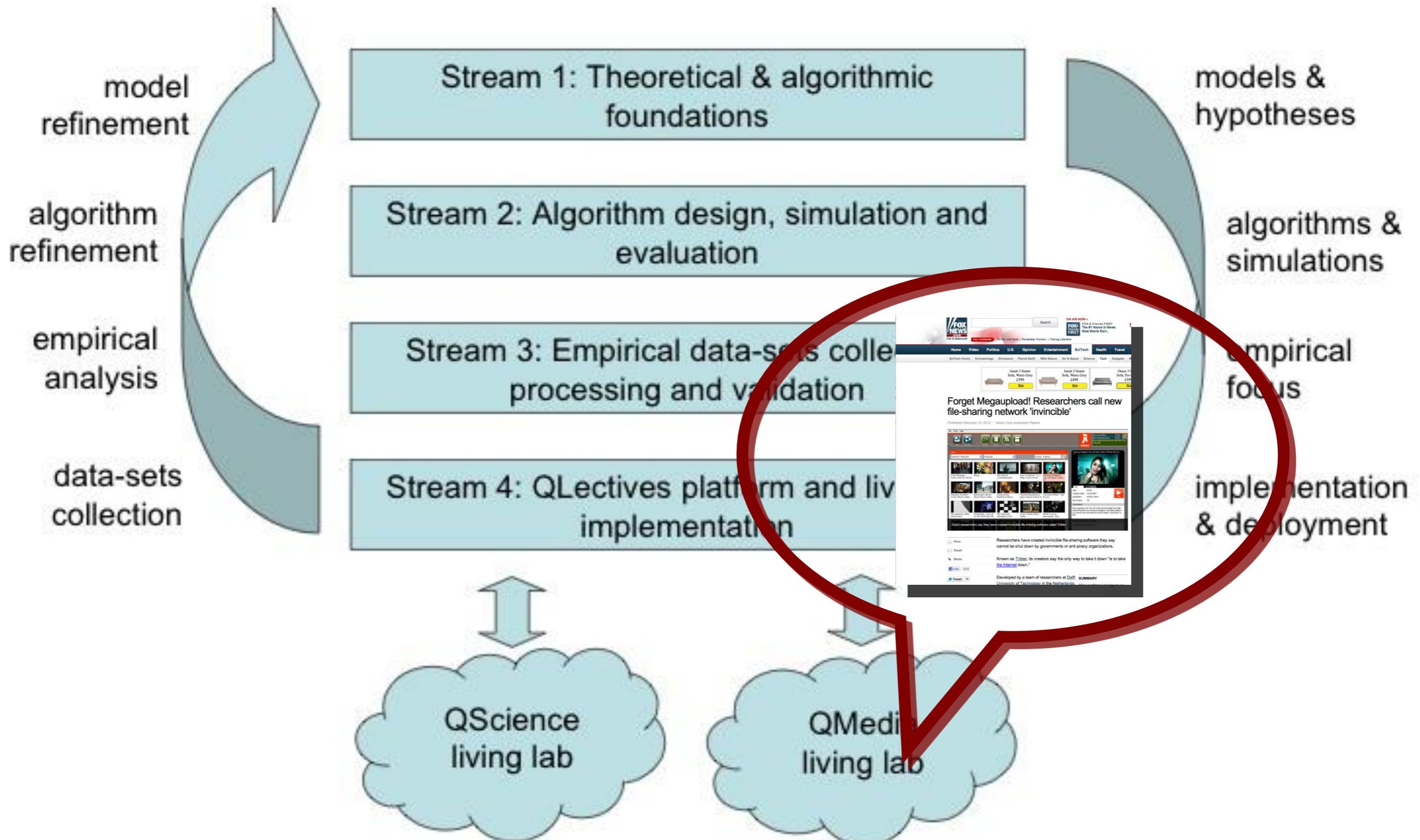
- Given a network of autonomous nodes
 - possibly many millions of them, with fragile links
- How can one implement
 - reputation mechanisms
 - spam filtering
 - recommender systems
 - distribution of global data through the network
- While preserving
 - scalability
 - privacy



The practice

QMedia





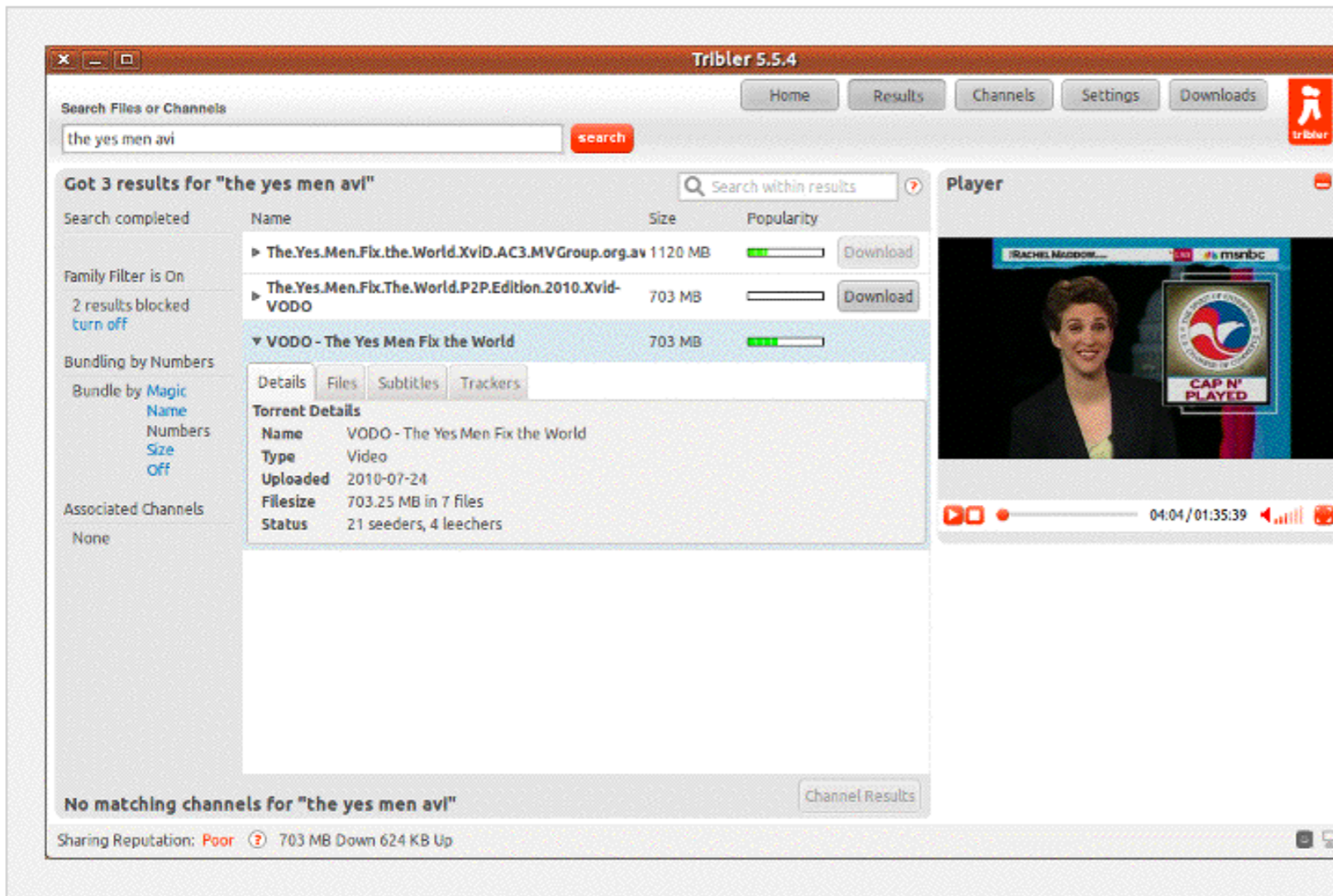
**Sorry, the web page you have requested
is not available through Virgin Media.**

Virgin Media has received an order from the Courts
requiring us to prevent access to this site in order to
help protect against copyright infringement.

If you are a Virgin Media home broadband customer, for
more information on why certain web pages are
blocked, please click [here](#).

If you are a Virgin Media Business customer, or are
trying to view this page through your company's internet
connection, please click [here](#).





Tribler 5.9

A different BitTorrent client

- Fast content search
- Wiki-style channels
- Video-on-demand support
- Fully decentralized
- No ads

[Download page](#)

[[Windows](#) | [Mac](#) | [Ubuntu](#)]

[And let us know what you think.](#)



Search Files or Channels

search

Categories

- Popular
- New
- Updated
- Favorites
- All
- My Channel

Quick Tip: All Channels are ordered by popularity. Popularity is measured by the number of Tribler users which have marked this channel as favorite.

Popular Channels (Showing the 20 most popular channels)

Family Filter is Off, [turn on](#)

Name	Latest Update	Popularity	Torrents
☆ DVDRIP	18-08-2011	★★★★★	466
☆ ==>>> EZTV <<<==	27-09-2011	★★★★★	1101
★ Latest Albums	21-09-2011	★★★★★	439
☆ harrykar-ebooks	16-05-2011	★★★★☆	48
★ PIRate	20-01-2011	★★★☆☆	5
☆ WANNY	29-07-2011	★★☆☆☆	2
☆ ==>>> LOSSLESS FLAC <<<==	19-01-2011	★★☆☆☆	3
★ VODO	20-09-2011	★☆☆☆☆	77
☆ Demonoid	19-01-2011	★☆☆☆☆	34
my micrology	06-10-2011	New	1
☆ themorfeas	04-10-2011	New	47
☆ Tribler	03-10-2011	New	51
☆ ASESORIA_HP	02-10-2011	New	10
☆ PC-Mario	02-10-2011	New	19
☆ Jake	29-09-2011	New	3
☆ pigi-Komputer	24-09-2011	New	1
☆ Dori-PC	21-09-2011	New	4
☆ Free Video Lectures	20-09-2011	New	54
☆ TED Talks	20-09-2011	New	56
☆ daniel-PC	20-09-2011	New	4





Search Files or Channels

QLectives - Socially Intelligent Systems's channel (Discovered 19 torrents)

Family Filter is Off, [turn on](#)

Contents Comments Activity

Name	Date Added	Size	Popularity
▶ D4.2.3 QScience v3.pdf	21-03-2012	2 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D3.1.2 Web experiments and initial results.pdf	21-03-2012	0 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D4.1.3 QLective Platform v3.pdf	21-03-2012	1 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D5.5 Publication and dissemination report.pdf	21-03-2012	1 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D4.3.3 QMedia v3.pdf	21-03-2012	2 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D6.3 Deliverable D6.3 Project Report.pdf	21-03-2012	1 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D1.2.1 Novel models of agency and social structure for trust and cooperation.pdf.torrent	21-03-2012	0 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D1.4.1 Modelling the dynamics of quality collectives.pdf	21-03-2012	1 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D2.1.3 Empirically informed algorithm design for cooperation - experiments and results.pdf.torrent	21-03-2012	0 MB <input type="text"/>	<input type="button" value="Download"/>
▶ D2.3.1 Report on the deployment of protocols in living lab environments.pdf	21-03-2012	1 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Edmund Chattoe-Brown Talk.m4v	10-03-2012	556 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Pietro Terna Talk ESSA Summer School 2011.m4v	09-03-2012	320 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Klaus Troitzsch Talk ESSA Summer School 2011.m4v	09-03-2012	389 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Warren Thorngate Talk ESSA Summer School 2011.m4v	09-03-2012	349 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Paul Ormerod Talk ESSA Summer School 2011.m4v	09-03-2012	377 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Iris Lorscheid Talk ESSA Summer School 2011.m4v	09-03-2012	381 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Bruce Edmonds Talk ESSA Summer School 2011.m4v	09-03-2012	472 MB <input type="text"/>	<input type="button" value="Download"/>
▶ Flaminio Squazzoni Talk ESSA Summer School 2011.m4v	09-03-2012	366 MB <input type="text"/>	<input type="button" value="Download"/>

Thank you for marking this Channel as your Favorite.

Sharing Reputation: Good  1 GB Down 2 GB Up



QMedia

- Completely decentralised
 - No central web site like piratebay.org
- Quality assessed through self-organising personalised collectives
 - called ‘channels’
- Users can
 - publish and consume media files
 - create and modify metadata
 - post comments

Challenges

- Peer discovery
 - puncture NATs (network allocation table, i.e. a router)
 - random walk algorithm
- Free riding bandwidth
- Anti-spam measures
 - user comments
- Security
 - Dispersy distributed permission system
- Scalability
 - works with 10,000s nodes
- Extensibility
 - user widgets
- Performance
 - carefully tuned
- Portability
 - written in Python, with MySQL database at each node
- Availability
 - open source

<p>Jonah 3 Seater Sofa, Warm Grey £599</p> <p>Go</p>	<p>Jonah 2 Seater Sofa, Warm Grey £499</p> <p>Go</p>	<p>Orson 3 Seater Sofa, Pavi £599</p> <p>Go</p>
-----------------------------------------------------------------	-----------------------------------------------------------------	------------------------------------------------------------

Forget Megaupload! Researchers call new file-sharing network 'invincible'

Published February 10, 2012 / News Corp Australian Papers

The screenshot shows the Tribler web interface. At the top, there are navigation icons for home, persons, profile, library, radio, and friends. A search bar contains 'music videos'. Below the search bar is a grid of video thumbnails with titles like 'Kylie Minogue - Come Into My World', 'Marques Houston - Circle (Music Video)', 'The Fall Of Constantinople', 'How To Dance: '1, 2 Step' Ciara music', 'Barlowgirl: Never Alone Music Video', 'Discovering Electronic Music', 'FoundryMusicDanny plays Dance Dance R', 'Christina Milian - Dip It Low', 'The Specials 1981: Ghost town', 'Timbaland - Give It To Me OFFICIAL MU', 'The Specials: Gangstas 1979', 'Crazy Indian Music Video', and 'What Is Love - Barwanah, Iraq'. On the right side, a video player is embedded, showing 'Vanessa Hudgens Say Ok Music Video (Official with Zac...)'. Below the player, there is a description and a 'play' button.

Dutch researchers say they have created invincible file-sharing software called Tribler.

- Print
- Email
- Share
- Like 333
- Tweet 78

Researchers have created invincible file-sharing software they say cannot be shut down by governments or anti-piracy organizations.

Known as [Tribler](#), its creators say the only way to take it down "is to take [the Internet](#) down."

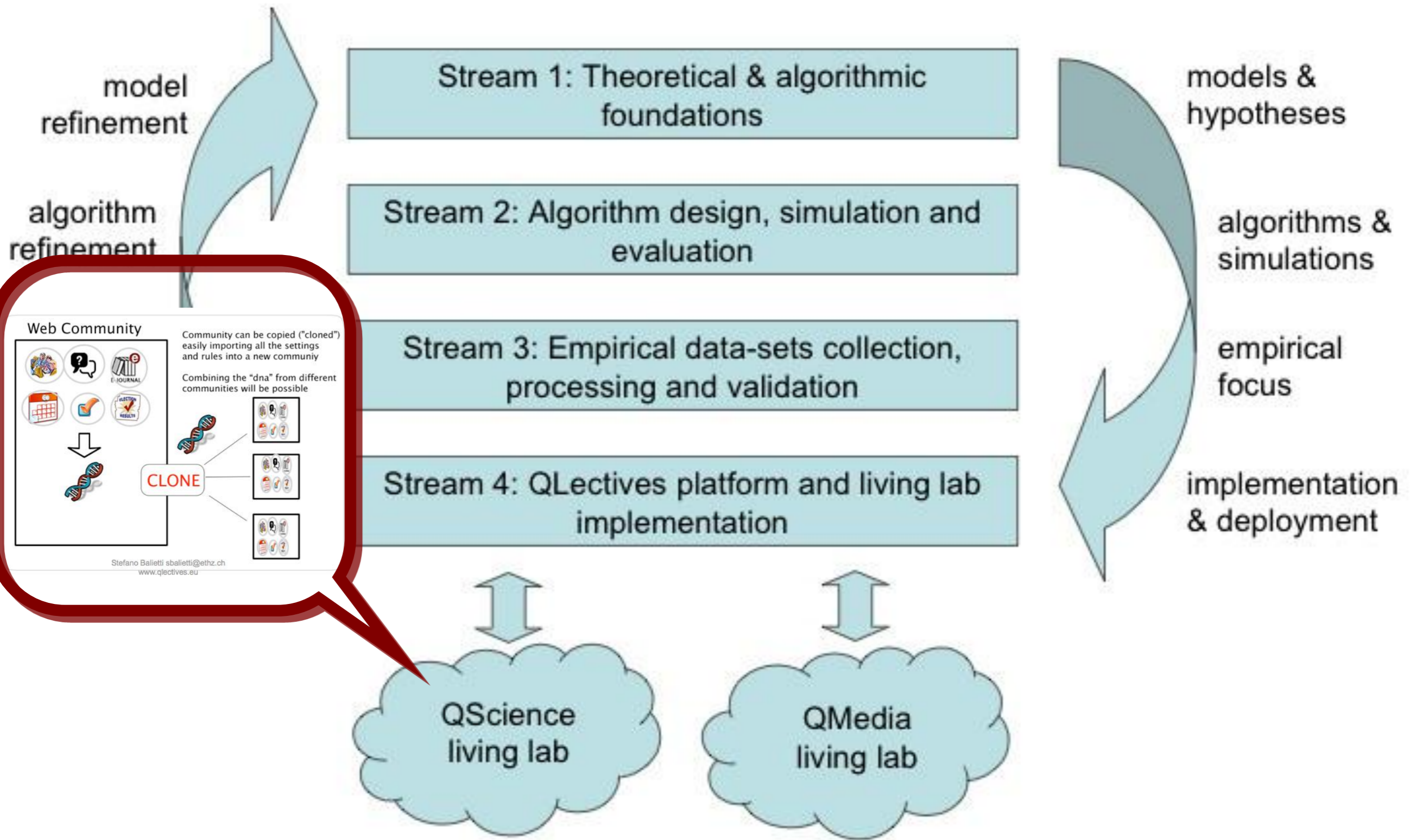
Developed by a team of researchers at [Delft University of Technology](#) in the Netherlands.

SUMMARY

QScience



With thanks to Stephano Baliatti for many of the slides in this section



Web Community

Community can be copied ("cloned") easily importing all the settings and rules into a new community

Combining the "dna" from different communities will be possible

CLONE

Stefano Balletti sballetti@ethz.ch
www.qlectives.eu

QScience

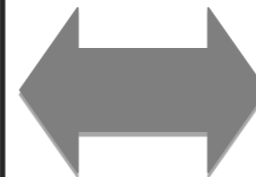
- QScience is an **open, modular, service-oriented, web-based** platform supporting self-organization in networks of **evolving, distributed** communities of individuals.

Principles

- 1. QScience is **Evolution**
- QScience is **Integration**
- QScience is **Features**

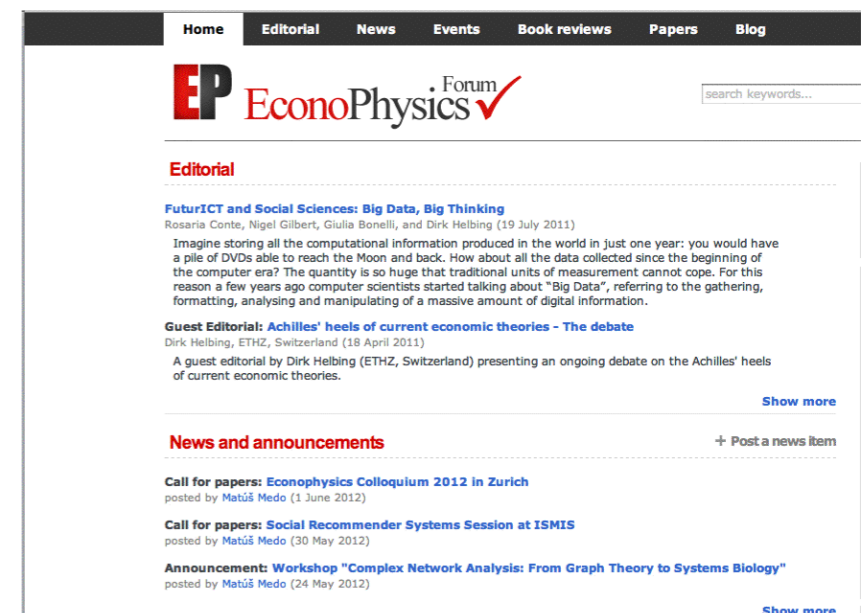
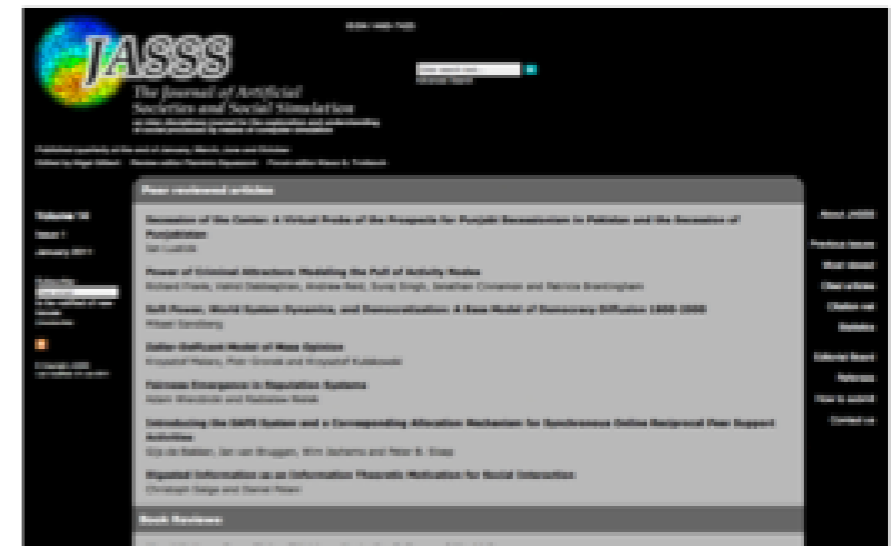
Drupal modules

- Patterns
- 1. D2D
- Living Science



QScience

- Science is increasingly depending on the web for
 - Scientific communities
 - Online journals
 - Collaborative projects
 - Research opportunities
 - On-line courses



Science Today



Trends discovery



Communication

rank	author	h_m index
1	S FREUD psychology	164.02
2	P BOURDIEU sociology	138.58
3	E WITTEN physics, particles & fields	114.57
4	N CHOMSKY philosophy	98.20
5	P KRUGMAN economics	95.37
6	ANTKARE computer science, information systems	94.00
7	A GIDDENS sociology	87.83
8	K MARX philosophy	85.95

Indexes of scientific productivity

Drupal™

Come for the software, stay for the community

Drupal is an open source content management platform powering millions of websites and applications. It's built, used, and supported by an active and diverse community of people around the world.

Search drupal.org

Refine your search

- All
- Documentation
- Modules
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- Groups

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Use Drupal to build everything from personal blogs to enterprise applications. Thousands of add-on modules and designs let you build any site you can imagine. Join us!

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Distributions are a collection of pre-configured themes and modules for feature-rich web sites giving you a head start on building your site. Build your own online communities, media portal, online store, and more!

[Learn about Distributions](#)

Sites Made with Drupal



Popular Science Magazine (PopSci.com) Case Study

Drupal is used by some of the biggest sites on the Web, like [The Economist](#), [Examiner.com](#) and [The White House](#). Read more [Drupal case studies](#).

Develop with Drupal

16,374 Modules	This week
1,397 Themes	2,837 Code commits
415 Distributions	6,536 Issue comments
18,253 Developers	

[Drupal Core](#)
[Security Info](#)
[Developer Docs](#)
[API Docs](#)



830,858 people in 228 countries* speaking 181 languages power Drupal.

Editorial

FuturICT and Social Sciences: Big Data, Big Thinking

Rosaria Conte, Nigel Gilbert, Giulia Bonelli, and Dirk Helbing (19 July 2011)

Imagine storing all the computational information produced in the world in just one year: you would have a pile of DVDs able to reach the Moon and back. How about all the data collected since the beginning of the computer era? The quantity is so huge that traditional units of measurement cannot cope. For this reason a few years ago computer scientists started talking about "Big Data", referring to the gathering, formatting, analysing and manipulating of a massive amount of digital information.

Guest Editorial: Achilles' heels of current economic theories - The debate

Dirk Helbing, ETHZ, Switzerland (18 April 2011)

A guest editorial by Dirk Helbing (ETHZ, Switzerland) presenting an ongoing debate on the Achilles' heels of current economic theories.

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News and announcements

[+ Post a news item](#)

Call for papers: Econophysics Colloquium 2012 in Zurich

posted by [Matúš Medo](#) (1 June 2012)

Call for papers: Social Recommender Systems Session at ISMIS

posted by [Matúš Medo](#) (30 May 2012)

Announcement: Workshop "Complex Network Analysis: From Graph Theory to Systems Biology"

posted by [Matúš Medo](#) (24 May 2012)

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Current & future events

[+ Post an event](#)

21 June 2012 - 23 June 2012

W.E.H.I.A. 2012, 17th Annual Workshop on Economic Heterogeneous Interacting Agents

posted by [mraddant](#) (10 January 2012)

NEW

- [▶ An Open Letter to George Soros](#)
- [▶ NESS Note of Meeting](#)

Latest blogs

[Post a blog](#)

- [▶ Thermo-econophysics?](#)
by JRHulls (7:46 26 May 2012)
- [▶ The kink in the US GDP curve](#)
by JRHulls (1:27 17 April 2012)
- [▶ PhD in SocioPhysics \(or at most Socio-Econo-Physics\)](#)
by Loreti (4:09 14 April 2012)
- [▶ Dear Colleagues, let us fix the 'government' by weening them off of the 'geek'](#)
by fredrick michael, PhD (3:54 14 April 2012)
- [▶ I finished book nr. 5 today](#)
by Joe McCauley (7:12 5 April 2012)

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Popular papers



[by views](#)

[by downloads](#)

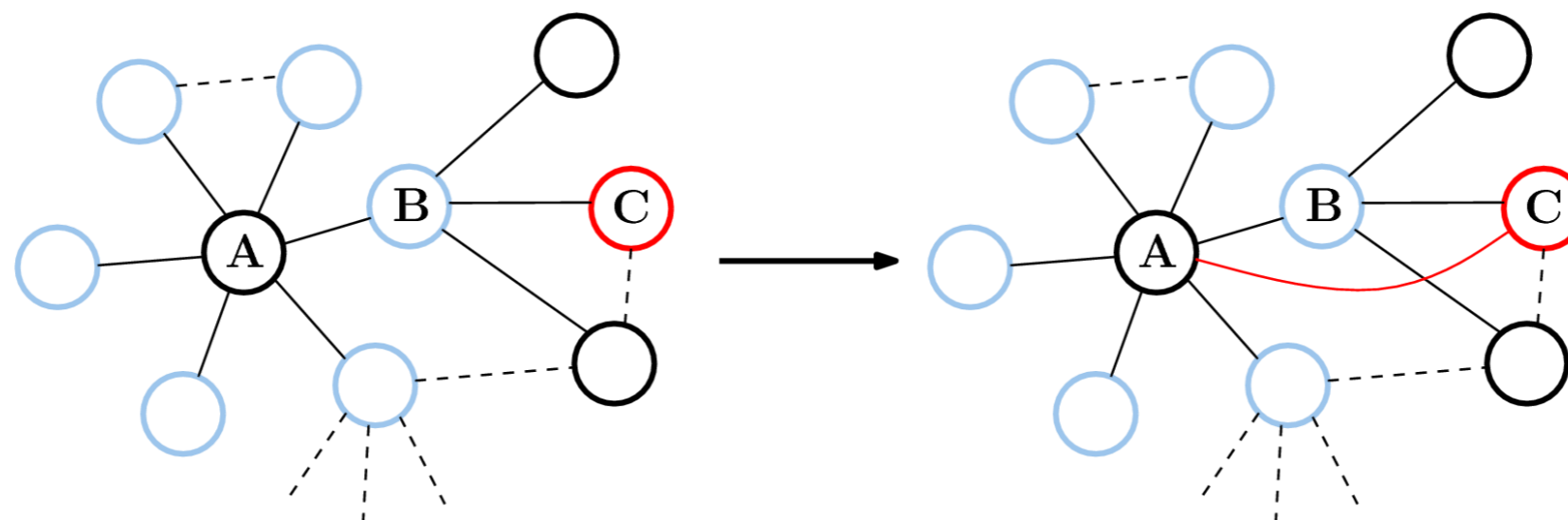
[by votes](#)

[Analyzing Netizen's View and Reply Behaviors on the Forum \(99 views\)](#)

[▶ The evolution of interdisciplinarity in physics research \(97 views\)](#)

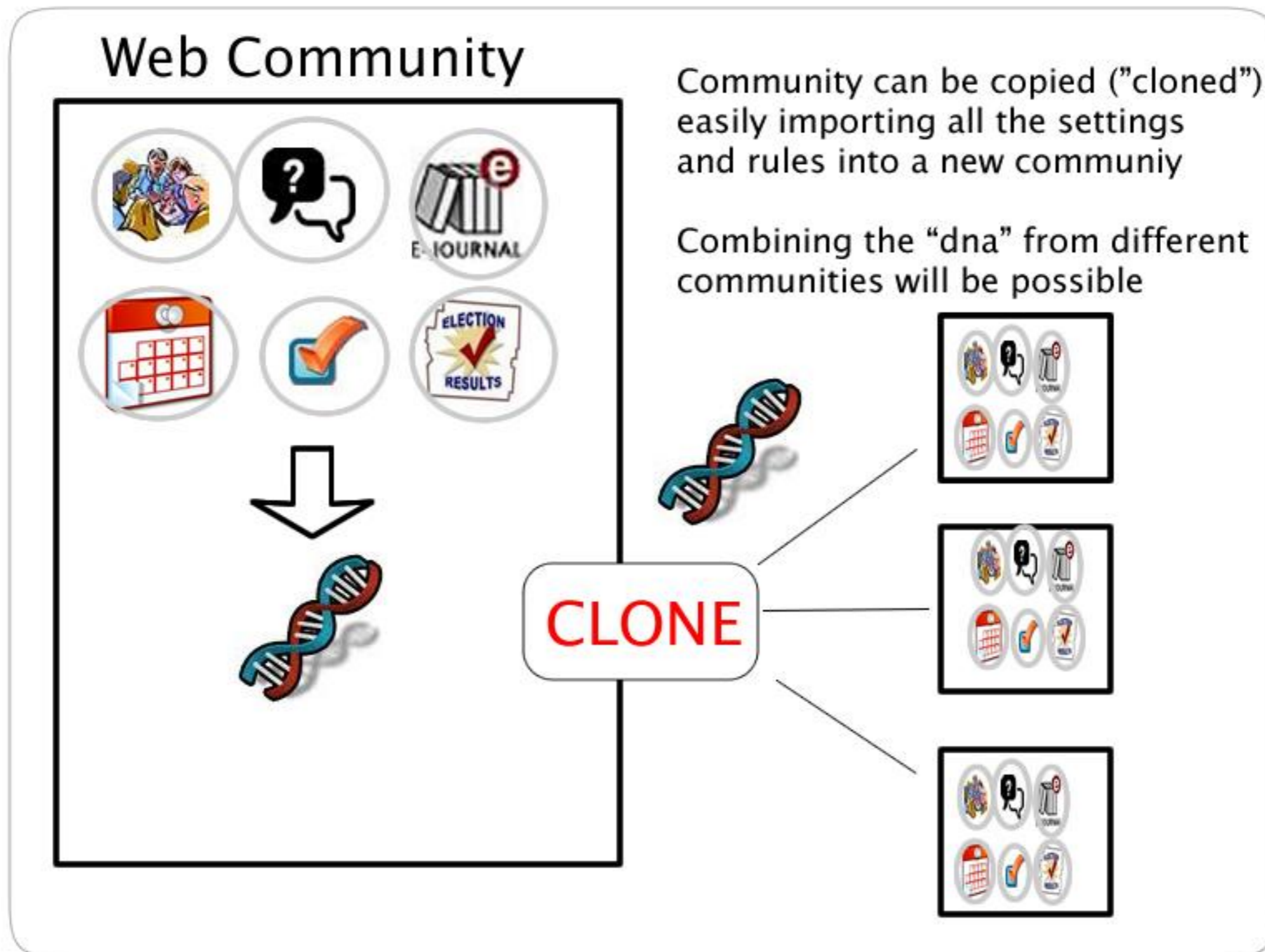
QScience Drupal-2-Drupal Module

- **Peer-to-peer network** among Drupal instances.
- Friendship established using **strong cryptography**:
 - Digital signatures attest friendships
 - Secure communication using public key cryptography



- Easy to discover new friends with recommendations

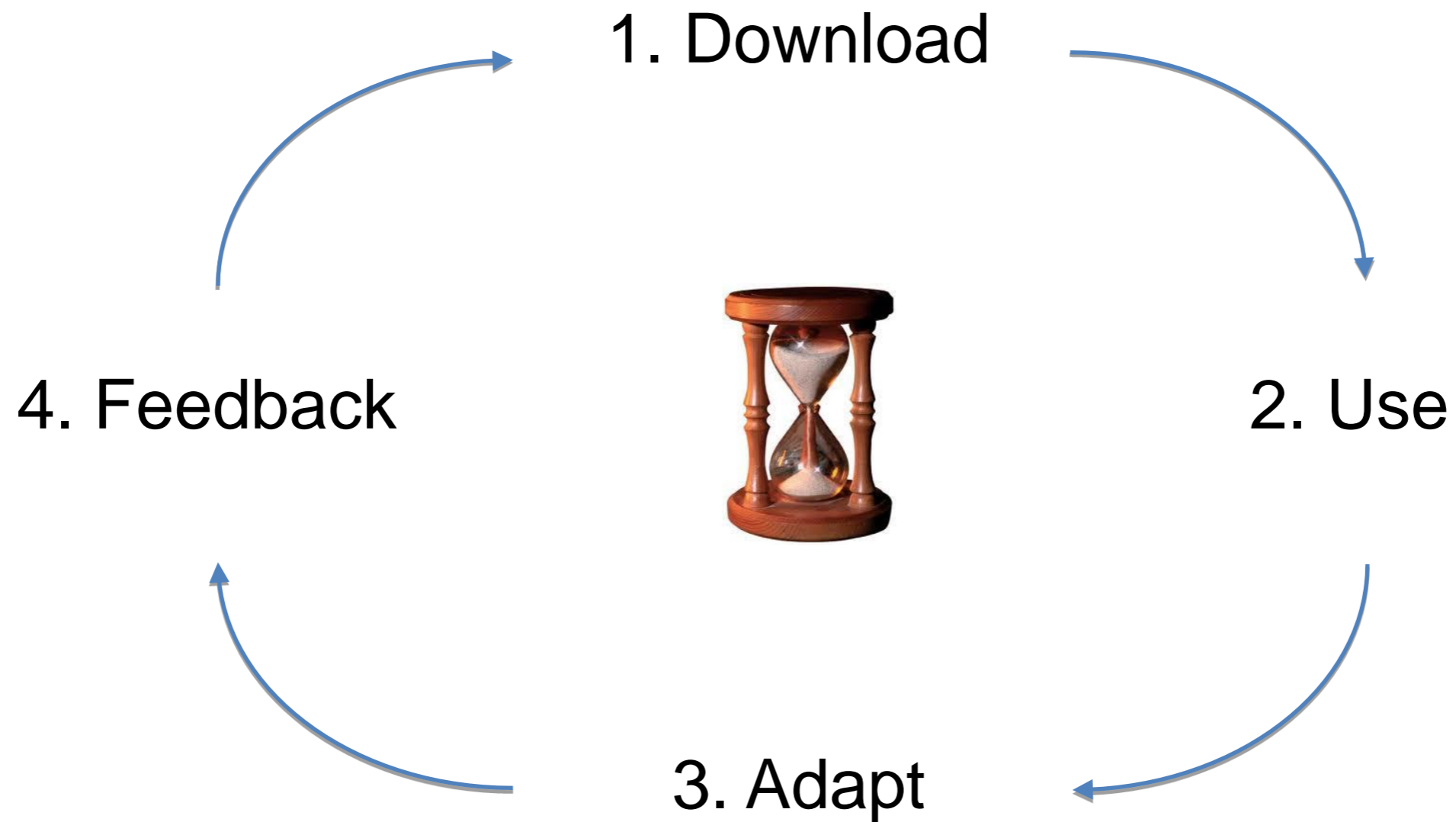
QScience Patterns



Patterns

- Drupal allows the creation of complex websites
- The setup and configuration process is very time consuming and requires knowledge of Drupal concepts
- The Patterns modules bypasses this bottleneck:
 - Manages and automates site configuration
 - Configurations stored in YAML/XML files which are easy to share

QScience Evolutionary Feedback Loop



The future

- QMedia

- migrates to smart phones
- supports microblogging
- remains open source

- QScience

- demo applications
 - learned society site
 - Horizon 2020 project sites



Key Facts

- Project Start Date:**
Mar 1 2009
- Project End Date:**
Feb 28 2013
- Coordinator:**
University of Surrey, UK

Highlights

- ESSA Summer School 2011
- Game Theory & Society: Models of Social Interaction in Sociological Research Workshop
- QLectives Leaflet
- QLectives Platform
- QMedia
- QScience
- Quality in Techno-Social Systems (QTESO) Workshop
- QualityCommons Workshop

QLectives (Quality Collectives)

QLectives is a project bringing together top social modelers, peer-to-peer engineers and physicists to design and deploy next generation self-organising socially intelligent information systems. The project aims to combine three recent trends within information systems:

- **Social networks** - in which people link to others over the Internet to gain value and facilitate collaboration (think of **Facebook**)
- **Peer production** - in which people collectively produce informational products and experiences without traditional hierarchies or market incentives (think **Wikipedia**)

Peer-to-peer systems - in which software is running on user machines & distribute multiple copies of information without a central server or administrative control (think of **BitTorrent**)

QLectives aims to bring these together to form Quality Collectives, i.e. functional decentralised communities that self-organise and self-maintain for the benefit of the people who comprise them. We aim to generate theory at the social level, design algorithms and deploy prototypes targeted towards two application domains:

- **QMedia** - an interactive peer-to-peer media distribution system (including live streaming), providing fully distributed social filtering and recommendation for quality (think of **social television 2.0**)
- **QScience** - a distributed platform for scientists allowing them to locate or form new communities and quality reviewing mechanisms, which are transparent and promote quality (think of **Slashdot** for any particular discipline or sub-discipline)

QLectives is supported by the European Commission 7th Framework Programme (FP7) for Research and Technological Development under the Information and Communication Technologies Theme, Future and Emerging Technologies (FET) Proactive, Call 3: ICT-2007.8.4 Science of Complex Systems for socially intelligent ICT (COSH-ICT).

COMMON INTERESTS POOLED RESOURCES QUALITY CONTENT

A European project to connect people with common interests and deliver quality content to them



Login

Login

Events Calendar

June 2012						
M	T	W	T	F	S	S
28	29	30	31	1	2	3
	5	6	7	8	9	10
	12	13	14	15	16	17
	18	19	20	21	22	23
	25	26	27	28	29	30

QLectives Events

No events

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Events Legend

- Workshop
- Seminar
- Default
- Conference
- All Categories ...

<http://qlectives.eu>