citizen cyberscience centre

Citizen Cyberscience Centre Management Review

18 May 2010
CERN

Meeting Objectives

- Review progress of the CCC in attracting partners and sponsors and initiating projects, since launch in July 2009.

- Decide on conditions for transition of the CCC from one-year pilot phase to longer-term initiative.

- Discuss and prioritize workplan for coming year, including future sponsorship strategy.

Meeting Agenda

- 11:00 Introduction and CCC Agreement Review (Miguel Marquina)

- 11:15 Current Sponsors and Projects
  - Project Sponsor IBM and China Clean Water project (Francois Grey)
  - Project Sponsor HP and AfricaMap project (Christian Pellegrini and Francesco Pisano)
  - LHC@home and LHC+@home (Miguel Marquina, Ben Segal and John Ellis)
  - Shuttleworth Foundation as Founding Sponsor (Francois Grey)

- 12:00 Plans for the Second Year
  - Partners' intention to continue beyond first year
  - Proposals for CCC physical location and management structure
  - Proposal for initial PR and website
  - Plan and prioritize search for other sponsors

- 12:30 Discussion and Lunch in Restaurant 2

CCC Scope and Activities

Scope:

Applications of Citizen Cyberscience that promote humanitarian and development priorities relevant to the UN, as well as help scientists in developing countries participate in fundamental research.

Activities:

- Providing consultancy to researchers and practitioners interested to apply Cyberscience techniques.
- Organizing hands-on workshops that promote the use of Citizen Cyberscience.
- Coordinating and providing technical guidance to multidisciplinary teams developing new cyberscience applications.
- creating pedagogical material for the general public, civil society organizations and schools.

CCC Agreement Review

First year of the Project shall be considered as a pilot phase in which to:

- position the role of the Citizen Cyberscience Centre clearly with respect to other major initiatives;
- establish at least five partnerships with key research institutions in Europe, North America, Latin America, Africa and Asia;
- raise external funding of about two million Swiss francs to support a small team, and organize a series of workshops, conferences and short-term development projects over a period of five years.

Position

- Partnership agreement:
  - BOINC (CC platform developer)
  - World Community Grid (CC project host)

- Discussions initiated:
  - ISOC (Internet initiatives for education)
  - Web Foundation (developing world web initiatives)
  - Citizen Science Alliance (CC project host)

- Future discussions: WLCG, EGI …

Partners

- Associate Partners :
  - University of Cape Town*
  - University of California at Berkeley*
  - University of Extremadura*
  - Swiss Tropical Institute *
  - Chinese Academy of Sciences (IHEP)
  - Academia Sinica (ASGC)
  - Queen Mary University of London
  - University College London

*exchange of letters completed

External Funding

- IBM World Community Grid
  - 200kCHF/year in-kind support, renewable
  - Project to be launched in June

- HP Labs
  - US$82k funding , renewable + in-kind support + further funding tbc
  - Project to be launched in August

- Shuttleworth Foundation
  - 200kCHF fellowship as well as about 300kCHF for projects
  - Fellowship to start in September

- Summer student co-funded by CERN openlab, Allen foundation etc.
  - 4 students from China and India, worth 20kCHF

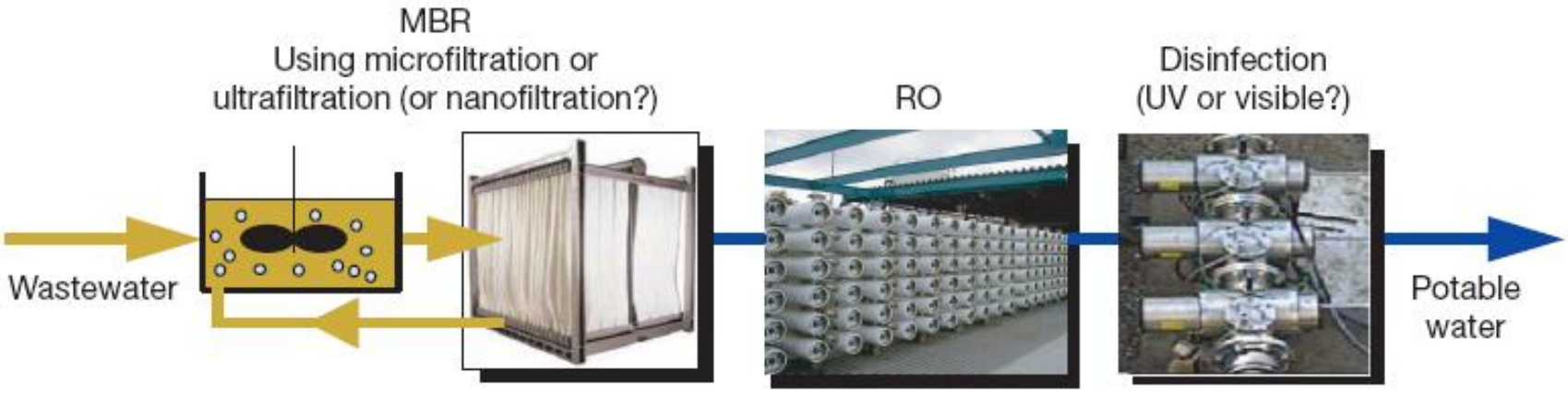
China Clean Water Project

- Result of Asia@home and CAS@home initiatives

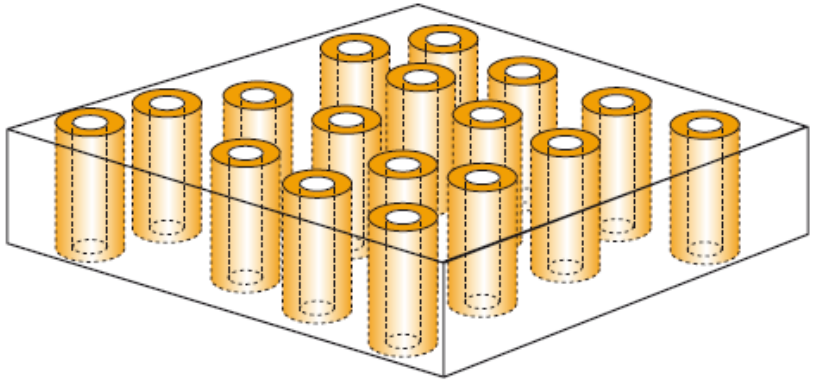
Context:

- 1.2bn people lack safe drinking water, 2.6bn no sanitation,
- millions of people die annually—3,900 children a day—from diseases transmitted through unsafe water.

The challenge

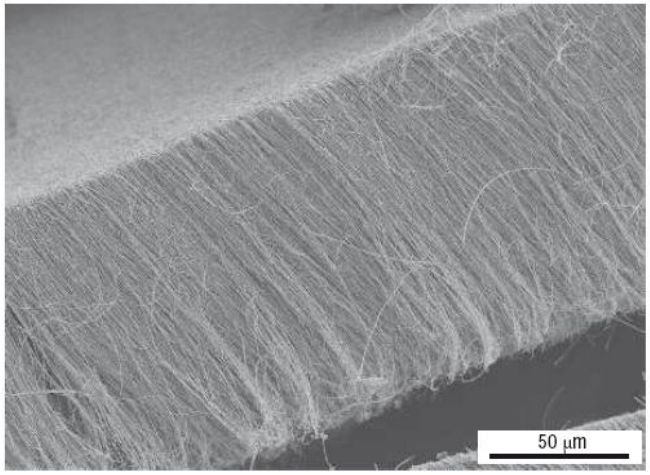


Next generation membrane treatment system for direct conversion to potable water.
M. Whitby, and N. Quirke, Nat. Nanotechnol. **2**, 87 (2007).



$$Q \sim R^4$$

The opportunity



$$Q \sim (1+4l_s/R)\, R^4$$

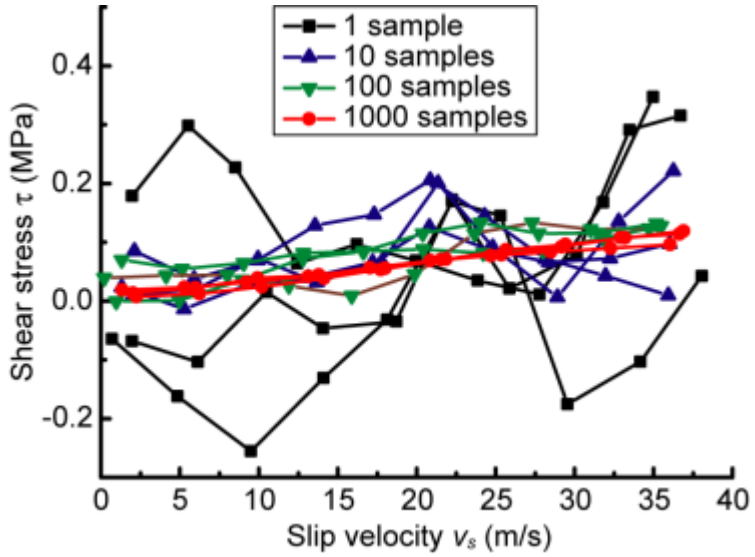
Dramatic flow enhancement in nanotube membranes – so far unexplained!
M. Majumder, N. Chopra, R. Andrews *et al.*, Nature **438**, 44 (2005).

	decane	ethanol	water
viscosity of fluid (Pa·s)	0.960	1.074	1.002
44 nm diameter nanopipes (this study)			
flow enhancement factor (ignoring effect of supporting grid)	28 ± 6	16 ± 1	22 ± 2
flow enhancement factor (allowing for effect of supporting grid)	45 ± 2	25 ± 2	34 ± 3
calculated slip length (nm, ignoring effect of supporting grid)	31 ± 2	21 ± 2	26 ± 2
calculated slip length (nm, allowing for effect of supporting grid)	41 ± 2	29 ± 2	35 ± 3
7 nm diameter nanotubes (Majumder et al. 2005)			
flow enhancement factor	3,941	32,143	61,404
calculated slip length (nm)	3,448	28,124	53,728
<2 nm diameter nanotubes (Holt et al. 2006)			
flow enhancement factor			560 to 8400
calculated slip length (nm)			140 to 1400

The computational challenge

Why does water slip so fast in nanotubes?

- Molecular dynamics (MD) simulation to provide insight.
- But MD only able to simulate at flow rates that are orders of magnitude much than experiment.
- Need of order 10^5 CPU years to approach experimental range



The partners

- Centre for Novel Multdisicplinary Mechanics, Tsinghua University
- The National Centre for Nano Science and Technology of the Chinese Academy of Sciences.
- The University of Sydney and Monash University, both in Australia
- The Citizen Cyberscience Centre

Timeline and future plans

- Announcement in IBM Smart Cities forum at Shanghai Expo, panel with Sam Palmisano, IBM CEO (2-3 June).
- Launch and IBM press release (end of June, beginning of July).
- First phase of project completed (end of 2010).
- CCC to continue to support Asia@Home and CAS@home initiatives, help launch more Asian projects
  - earthquake monitoring and simulation with ASGC
  - economic impact modelling with Asian Development Bank

AfricaMap Project

- OBJECTIVES
- To adapt an existing collective intelligence platform called BOSSA (http://bossa.berkeley.edu/) to the challenge of making maps of Africa from satellite images.
- To test a social networking infrastructure called HP Gloe (www.hpgloe.com) that enables shared annotation of the maps produced by the collective intelligence platform.
- Beyond disaster relief, approach can help manage territory, study desertification etc. Can also be extended beyond Africa. CCC to pursue this through a comprehensive research programme.

AfricaMap Project

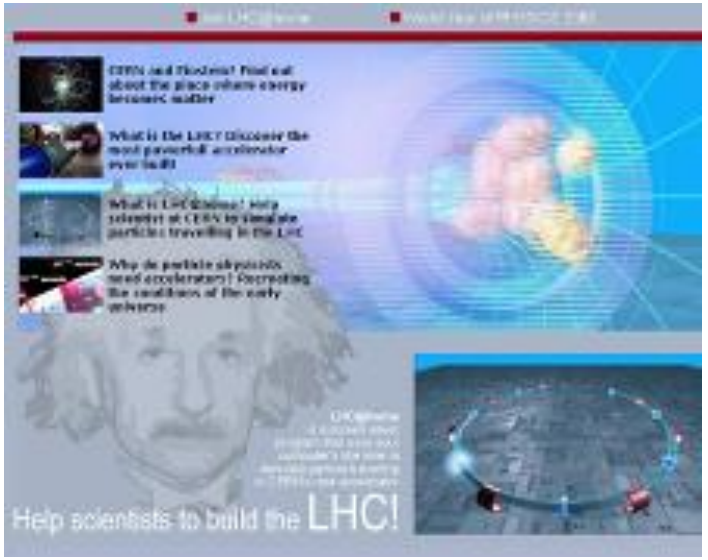
	Month											
Collective Intelligence	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Phase I - Research and Development												
Prototype review and document application building blocks												
Review previous geo-database development and testing												
Prepare satellite imagery and vector data for the project												
Phase II - Configuration and programming												
Configuration of Web GIS with BOSSA												
Programming of custom functions												
Web interface design												
Phase III - Test and Evaluation												
Alpha release to 100 volunteers												
Evaluation of alpha release												
Social Networking												
Phase I - Research												
HP Gloe requirements gathering with UNOSAT clients												
Phase II - Development												
Implementation of key requirements with HP Gloe developer												
Testing of implementation												
Phase III - Test and Evaluation												
Alpha phase test of HP Gloe with UNOSAT client												
Analysis of usage patterns during alpha phase testing with HPLabs												
Phase IV - Technology Merge												
Evaluate BOSSA/HP Gloe mashup												

AfricaMap Project

Participant	Role	Subproject
PI	Coordinate overall conclusion of Phase I, II and III	CI, SN
	Information Dissemination	CI, SN
Co-PI	Coordinate overall conclusion of Phase I, II and III	CI, SN
	Information Dissemination	CI, SN
PhD student	Research and Development	CI, SN
	Configuration and Programming	CI
	Collaboration with HP Labs	SN
	Configuration and Analysis	SN
	Information Dissemination	CI, SN
Researcher UNOSAT	Project Coordination	CI, SN
	Research and Development	CI, SN
Researcher KNUST	Research and Development	CI
	Configuration and Programming	CI
	Information Dissemination	CI
Researcher Univ. Bangui	Research and Development	CI
	Configuration and Programming	CI, SN
	Information Dissemination	CI, SN
Participants at CERN, CCC	Coordination with BOSSA development team	CI
	Coordination with HP Labs Team	SN
Participants at HP	HP Gloe support	SN
	Statistical analysis of usage patterns	CI, SN

LHC@home

- Calculates stability of proton orbits in CERN's new LHC accelerator
- System is nonlinear and unstable so numerically very sensitive. Hard to get identical results on all platforms
- About 40 000 users, 70 000 PC's… over 1500 CPU years of processing
- Objectives: extra CPU power and raising public awareness of CERN and the LHC - both successfully achieved.
- Started as an outreach project for CERN 50th Anniversary 2004; used for Year of Physics (Einstein Year) 2005



LHC@home

For “classic” LHC@home Sixtrack program, currently run for BE group by QMUL, new plan:

1. Hosting of servers to move to CERN, including:
   physical hardware and network hosting to return to CERN
   basic OS sysadmin, file backup, and restarting system after problems
2. BOINC server administration to move to EPFL, including:
   interface with application owners
   load new binaries, manage queue configuration, etc.
3. Application support (SixTrack) to be covered by BE, including:
   generating BOINC-ready binaries
   supervising input and output jobs
4. Outreach to be handled by QMUL in context of CCC partnership, including:
   taking care of the server message boards

NB: This project still very signficant for CERN outreach: **LHC@home is #3 entry if you Google LHC!**

LHC@home

Volunteers are asking: when can we help CERN with REAL physics?!

Next generation of LHC@home:volunteer computing as a cheap resource for the LHC experiments, capable of supporting event simulation and reconstruction jobs, conveniently accessed by existing job production facilities.

The underlying system is called "**BOINC-VM**" as it is based on two technologies, BOINC and CernVM:

A **working prototype** of BOINC-VM has been demonstrated running both ATLAS and ALICE jobs interfaced to those experiments' standard job production systems (PanDA for ATLAS and AliEn for ALICE). However, this ran only on a single “laboratory” BOINC PC.

LHC@home

Next step is to to prepare the **demonstration of a production system** with jobs running on a number of “real” BOINC volunteer client machines belonging to the BOINC “alpha-testing” community.

To take the system to this **Alpha production** state, the following work is required:

Task 1 : Basic BOINC-VM platform

Task 2 : CernVM / BOINC-VM configuration and job testing for one LHC experiment

Task 3 : ALICE and ATLAS Co-Pilot testing

Task 4 : Testing of integrated BOINC-VM Cloud system on a BOINC alpha-test network

Future: Prepare for beta phase , include CMS and LHCb

Two Chinese and two Indian summer students planned, funded by various sources (CERN openlab, Allen Foundation…)

Shuttleworth Foundation

- ***Establishing a global training programme.*** Based on Africa@home and Asia@home, a major challenge for the CCC is to ensure training workshops can scale to a whole region and sustain themselves through local initiatives.
  - Establish a global network of trainers and provide them with an online and up-to-date educational material.
  - Draw heavily on the existing grass-roots community supporting citizen cyberscience projects in the US and Europe.
  - Collaborate with regional champions: African Institute of Mathematical Sciences, Chinese Academy of Sciences…

- ***Promoting appropriate technologies.*** Engage with leading IT companies such as Google, IBM and Nokia, to exploit software and hardware developed by these companies for novel types of citizen cyberscience.
  - Run a series of meetings to explore ways in which IT industry can collaborate on citizen cyberscience.
  - Emphasis on open source technologies and open access science.

- ***Ensuring sustainability and visibility.*** The CCC needs to hire people with the right skills for promoting citizen cyberscience in schools, on the web and through novel approaches such as online gaming. To do this, the CCC must achieve a sustainable level of support.
  - A fund-raising campaign, taking full advantage of the Shuttleworth Foundation's networks.
  - Awareness raising through talks about the goals of the CCC, to attract future sponsors and partners.
  - Blogging, twittering and writing about citizen cyberscience, to attract a wider audience to citizen cyberscience.

Plans for second year

Discussion Points:

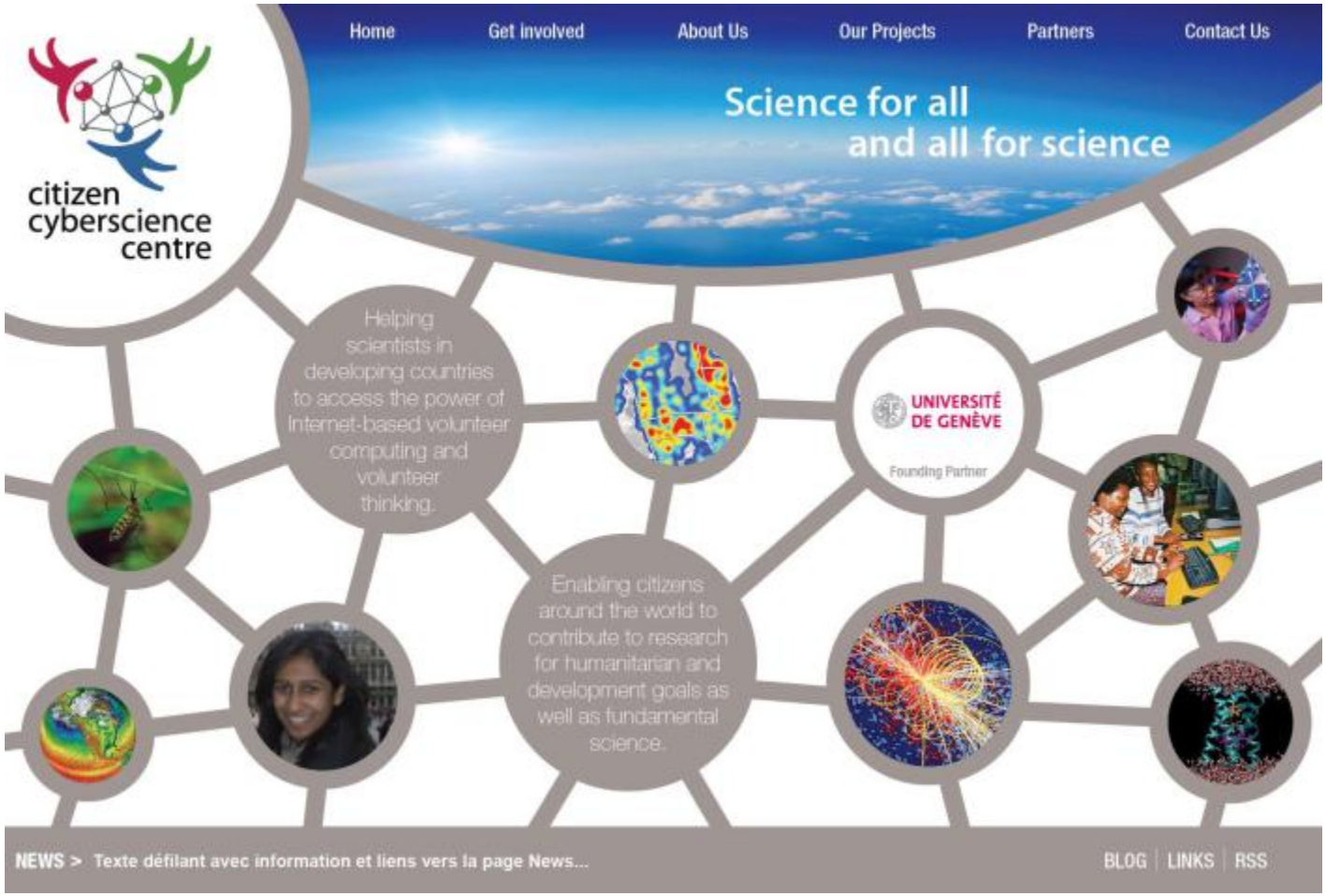
1) Partners' intention to continue beyond 1st year

2) Proposals for CCC physical location and management
   - Offices for 4-6 persons from September
   - Clear roles and lines of responsibility to be defined

3) Proposal for initial PR and website
   - Website designed by APO, hosted by UniGe, launch June
   - IBM PR June, HP PR August, Shuttleworth PR September

4) Plan and prioritize search for other sponsors
   - Nokia, Google, Intel…
   - UN member state support
   - Swiss and International Foundations

Plans for second year



citizen cyberscience centre

Science for all, and all for science.