Towards a Theory of Remote Scientific Collaboration (toTORSC)

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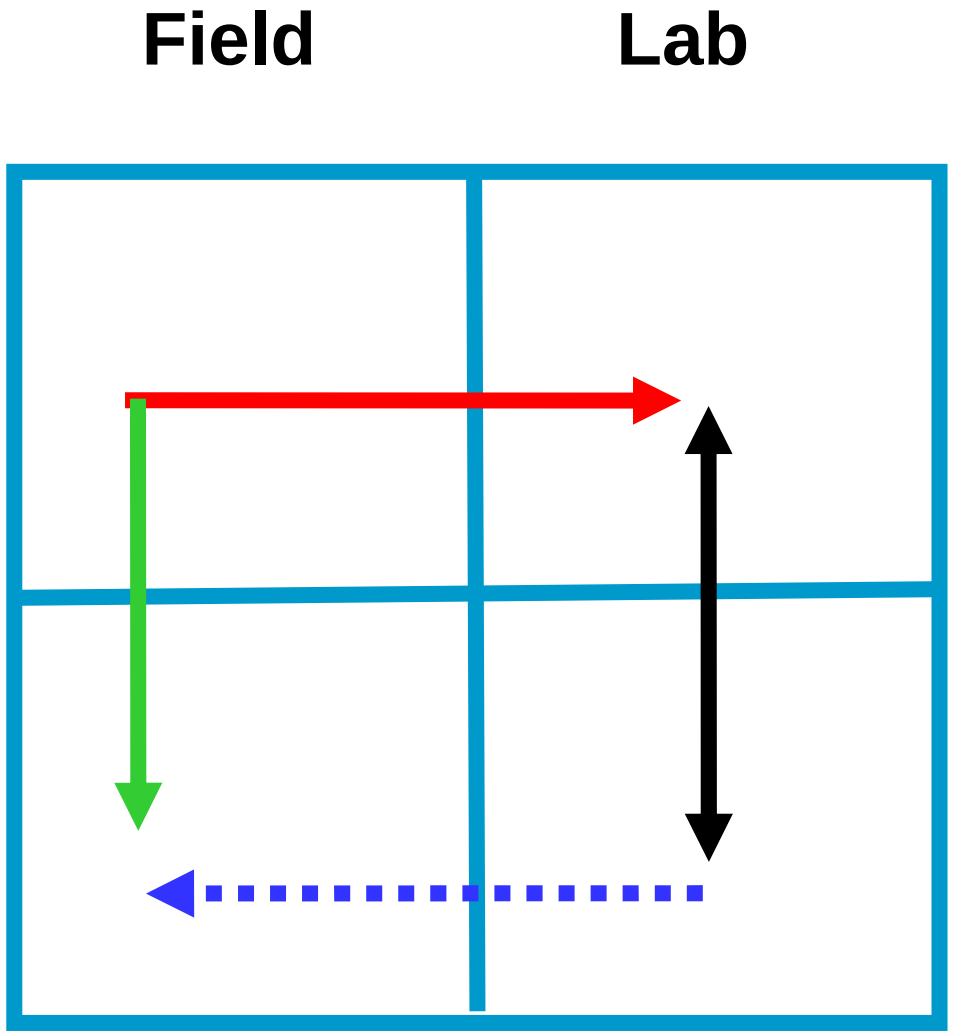
The approach

- One size does not fit all
- Understand the situation
  - The tasks
  - The technologies
  - The social/organizational situations
- Design
  - New technologies, new combinations of existing technologies
  - New social practices
- Evaluate
- Reflect

A Mix of Research Methods



Prior engagement with HEP

- Participated in a set of workshops about enabling the Global Accelerator Network in 2002
- Contributed to ATLAS Note ATL-GEN-2003-002 on collaborative tool opportunities

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www.scienceofcollaboratories.org

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Science of Collaboratories Project

- Perform a comparative analysis of collaboratory projects
- Develop general principles and design methods
- Test these principles on existing or upcoming collaboratories
- Develop of a Collaboratory Knowledge Base
  - technical and social data and detailed findings from existing collaboratory projects

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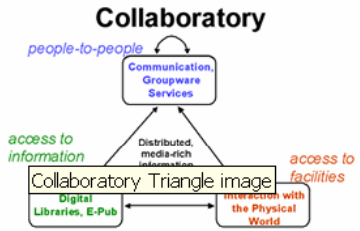
Science of Collaboratories Home

For more than a decade a number of collaboratory projects have been carried out in a variety of scientific and engineering fields. Most collaboratories have been built as one-off, hand-crafted projects. We seek to change this. The Science of Collaboratories (SOC) project is devoted to understanding the technical and behavioral principles that can lead to better, more successful design of collaboratories in the future.
Please explore this web site to learn more about:

- the SOC project overview,
- our mission
- the project activities
- the partner organizations involved
- the research team
- and, as the project proceeds, our findings and results.



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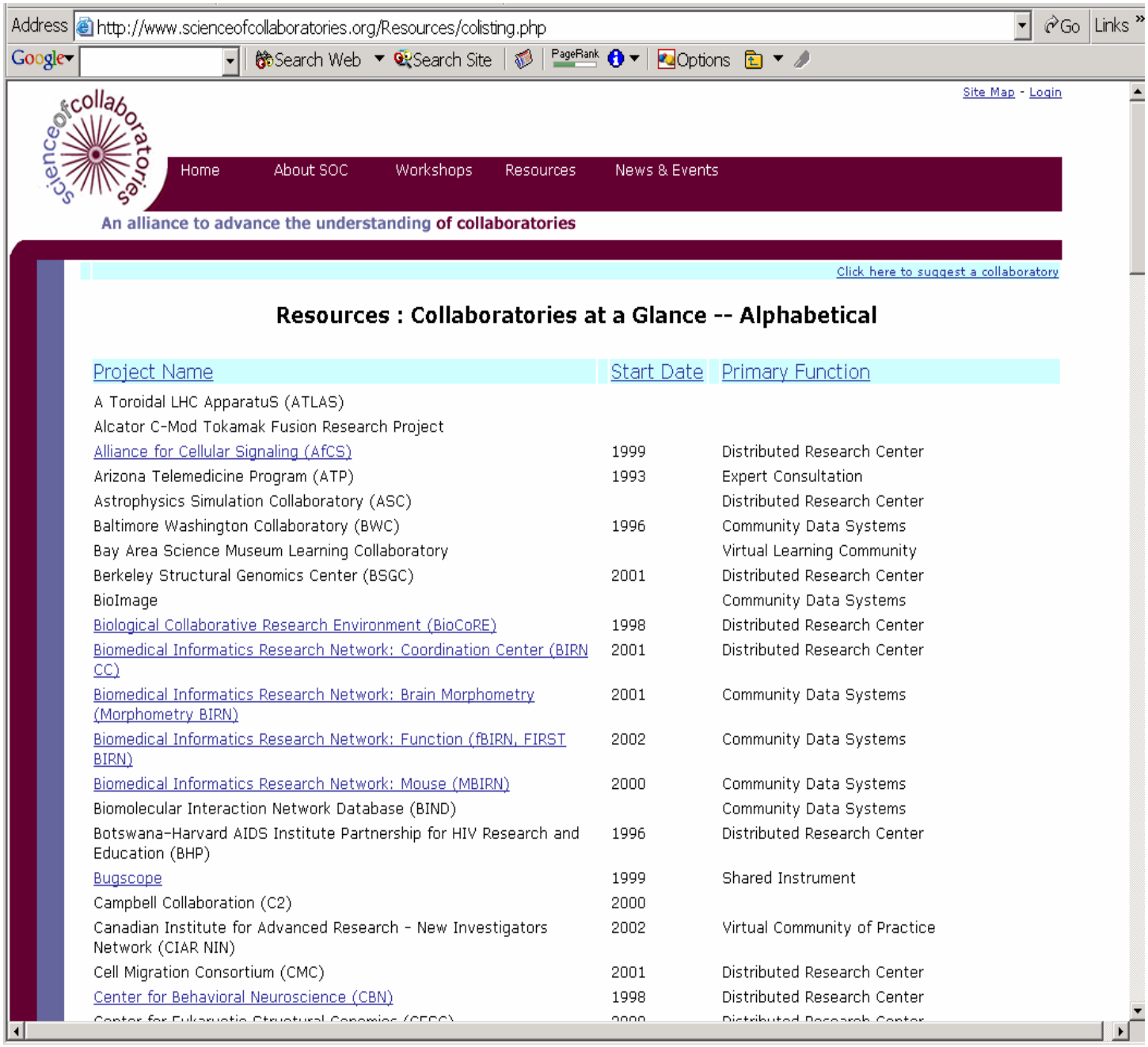
Collaboratories at a Glance

- Collect a large set of collaboratories
  - We have identified almost 200 examples
- Collect a basic set of information
- Note similarities and differences on both technical and social dimensions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Resources : Collaboratories at a Glance -- Alphabetical
Project Name
Start Date
Primary Function
A Toroidal LHC ApparatuS (ATLAS)
Alcator C-Mod Tokamak Fusion Research Project
Alliance for Cellular Signaling (AfCS) 1999 Distributed Research Center
Arizona Telemedicine Program (ATP) 1993 Expert Consultation
Astrophysics Simulation Collaboratory (ASC) Distributed Research Center
Baltimore Washington Collaboratory (BWC) 1996 Community Data Systems
Bay Area Science Museum Learning Collaboratory Virtual Learning Community
Berkeley Structural Genomics Center (BSGC) 2001 Distributed Research Center
BioImage Community Data Systems
Biological Collaborative Research Environment (BioCoRE) 1998 Distributed Research Center
Biomedical Informatics Research Network: Coordination Center (BIRN CC) 2001 Distributed Research Center
Biomedical Informatics Research Network: Brain Morphometry (Morphometry BIRN) 2001 Community Data Systems
Biomedical Informatics Research Network: Function (fBIRN, FIRST BIRN) 2002 Community Data Systems
Biomedical Informatics Research Network: Mouse (MBIRN) 2000 Community Data Systems
Biomolecular Interaction Network Database (BIND) Community Data Systems
Botswana-Harvard AIDS Institute Partnership for HIV Research and Education (BHP) 1996 Distributed Research Center
Bugscope 1999 Shared Instrument
Campbell Collaboration (C2) 2000
Canadian Institute for Advanced Research - New Investigators Network (CIAR NIN) 2002 Virtual Community of Practice
Cell Migration Consortium (CMC) 2001 Distributed Research Center
Center for Behavioral Neuroscience (CBN) 1998 Distributed Research Center

What is Success?

- Effects on the Science itself
- Effects on Science Careers
- Enhanced Science Education
- Inspiration to others
- Public perception
- Reuse of collaboratory tools

Factors That Affect Success

- The Nature of the Work
- Common Ground
- Collaboration Readiness
- Management, Planning and Decision Making
- Technology Readiness

Table 2. Factors that lead to success in Collaboratories

1. The Nature of the Work
Participants can work somewhat **independently** from one another
The work is **unambiguous**

2. Common Ground
Previous collaboration with these people was successful
Participants share a **common vocabulary**
If not, there is a dictionary

Participants share a **common management** or working style

3. Collaboration Readiness
The culture is naturally **collaborative**
The goals are **aligned** in each sub-community
Participants have a **motivation** to work together that includes mix of skills required, greater productivity, they like working together, there is something in it for everyone, NOT a mandate from the funder, the only way to get the money, asymmetries in value, etc.
Participants **trust** each other to be reliable, produce with high quality and have their best interests at heart
Participants have a sense of **collective efficacy** (able to complete tasks in spite of barriers)

4. Management, Planning and Decision Making
The principals have **time** to do this work
The distributed players can communicate with each other in **real time** more than 4 hours a day
There is critical **mass** at each location
There is a **point person** at each location
A **management plan** is in place
The **project manager** is
respected
has real PM experience
exhibits strong leadership qualities

Management, Planning and Decision Making, continued
A **communication plan** is in place
The plan has room for **reflection** and redirection
No **legal** issues remain (e.g. IP)
No **financial** issues remain (e.g. money is distributed to fit the work, not politics)
A **knowledge management system** is in place
Decision-making is free of **favoritism**
Decisions are based on **fair and open criteria**
Everyone has an opportunity to **influence** or challenge decisions
Leadership sets culture, management plan and makes the collaboratory visible.

5. Technology Readiness
Collaboration technologies provide the right functionality and are **easy to use**
If technologies need to be built, user-centered practices are in place
Participants are **comfortable** with the collaboration technologies
Technologies give **benefit** to the participants
Technologies are **reliable**
Agreement exists among participants as to what **platform** to use
Networking supports the work that needs to be done
Technical support resides at each location
An overall technical **coordinator** is in place

Special issues:
If data sharing is one of the goals, defacto standards are in place and shared by all participants, and a plan for archiving is in place

If instrument sharing is part of the collaboration, a plan to certify remote users is in place

The Collaboration Wizard

- The theory as a set of questions
- Remedies
- Red flags

"First let's talk a little bit about your work in general....

1. First of all, tell me a little bit about the type of work you do, who you work with, where they are located and your relationship with them.
2. For each of the remote workers, how dependent are you on their day to day activities? Do you have to coordinate often?
3. How routine is the work that you do? Does everyone know what they're doing, are you following a standard practice, or are you making it up as you go?"

The answers to a set of questions such as this would highlight the areas where management might want to put some attention and effort to insure that the collaboration has the greatest chance of success. And, where questions indicate some trouble, e.g. lack of trust, management consultants might recommend various remedies, e.g., trust building activities or use of contractual arrangements.

Further information

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- www.crew.umich.edu for papers
- www.scienceofcollaboratories.org