

# An Integrated Socio-Technical Crowdsourcing Platform for Accelerating Returns in eScience

Karl Aberer, Alexey Boyarsky, Philippe  
Cudré-Maurox, **Gianluca Demartini**,  
and Oleg Ruchayskiy



# Science

**Yesterday**



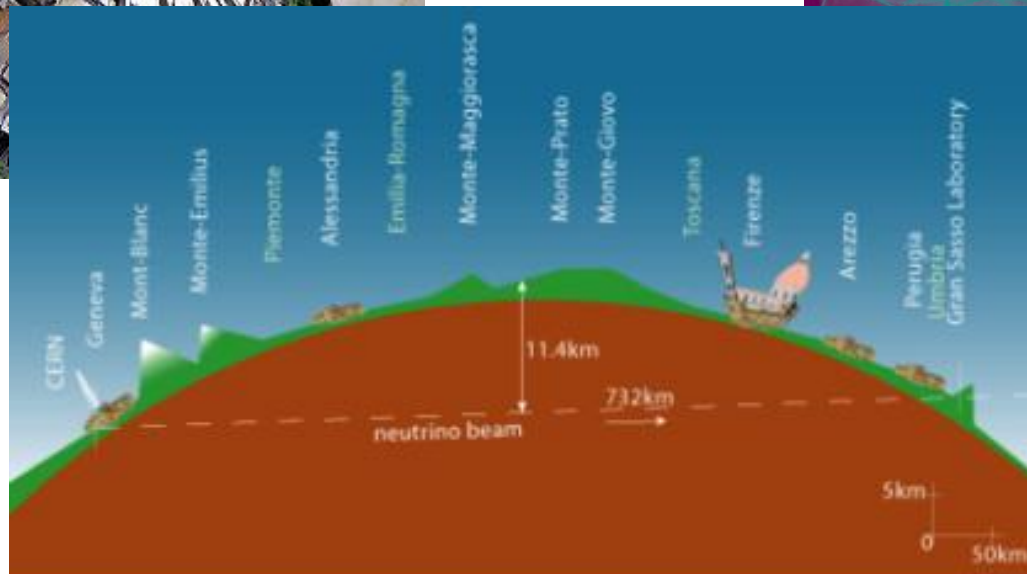
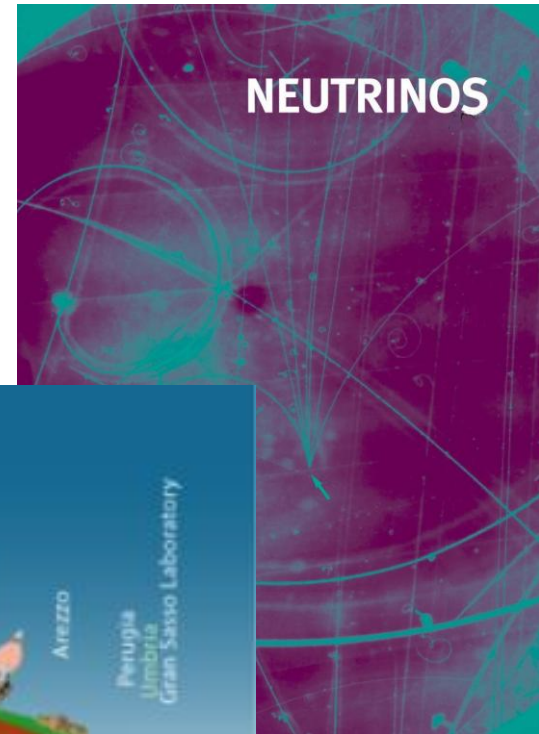
Gifted Individuals

**Today**



Collaborative Effort

# OPERA Collaboration



# Scientist-Computer Symbiosis

- A single scientist has no more the capacity to process all the information
  - High complexity of systems and workflows
  - Various fields of expertise involved
- New discoveries will emerge from **community-based socio-technical systems**

# Community-based Socio-technical Systems

- Such platforms will be useful
  - **Locally** to the scientist
  - By extracting knowledge used **globally**
- They will enable cross-pollination
  - All artifacts need to be interoperable
  - Higher order logic to combine them

# Science

**Tomorrow**



Collective Intelligence

# What do we need?

- Highly-expressive machine-readable formats
  - Ontologies of unprecedented quality
  - Implicit knowledge available in the head of the experts
- Understanding concepts, assumptions, phenomena, abstractions
- Create a mental map of a research field
- Understand analysis methods

# A Giant Crowdsourcing Conceptualization Machine



# Towards Self-Awareness

- A Scientific infrastructure
  - Complex ontological networks
  - Capture the scientific process
  - Automate routine operations
  - Share scientific artifacts
- Experts will train the system with their daily activities

# An “entropy-reduction” machine

- Relate entities
- Provide lineage information
- Discriminate conflicting information
- Reason and infer new data

# The Web: a Collective Intelligence engine

- Information systems are not instruments
- A catalyst for the scientific progress
- Reason and combine scientific artifacts at very large scale
  
- Individual scientist will not be able to fully appreciate models and methods

# Scientific progress

