

# Workshop Program

## Grand Research Challenges in Computer Science in Latin America 2008

“There are those that look at things the way they are, and ask, Why?... I dream of things as they never were and ask: Why not?” --Robert Kennedy

### 1. What is a Grand Challenges Workshop?

A Grand Challenges Workshop is not a traditional scientific event. Rather than aiming at discussion of ongoing research, its goal is to define research issues that will be important in the long run for science and for a country. It must be centered on discussion of scientific issues, and on creative thought, rather than following the usual scenario of scientific conferences, where the focus is on the validation of ideas, proofs and presentation of research results. It is not a conference for “defense of ideas or of personal research agendas” – it should foster collective work towards identifying and characterizing grand research problems. Participants should involve themselves in thinking about problems, rather than on specific disciplines or issues within a topic. Some characteristics of grand challenges are:

1. *They must be directed towards significant advances in science, rather than on incremental contributions based on existing results*
2. They must present a vision that goes beyond that of a typical grant application for a research project
3. They must be subject to clear and objective evaluation criteria
4. They should be decomposable and amenable to incremental diagnosis, so as to allow changes within the process to achieve them
5. They must be attractive and challenging for scientists, and motivate society as a whole, in particular the Latin America countries.
6. They originate problems that are multidisciplinary both in nature and solution
7. The topics that motivate them emerge from a consensus of the scientific community, and serve as a long-term scenario *for all researchers, regardless of financing policies or conjunctural issues.*

### 2. Similar proposals

Initiatives towards definition of grand research challenges have been undertaken for several scientific domains in countries with long scientific tradition, such as US and United Kingdom (UK) and Brazil. Examples include

- Grand Challenges in Environmental Sciences: **The National Research Council (NRC)** has been asked by the **National Science Foundation (NSF)** to identify

grand challenges in the arena of environmental sciences. NSF places a high value on interdisciplinary and multidisciplinary approaches because it believes many interesting environmental problems transcend traditional science disciplines, although those disciplines are essential components of any research program.

- Sustainability in the Chemical Industry: Grand Challenges and Research Needs: Green chemistry, replacing solvents, improving catalysts; Renewable fuel sources; Science literacy at all levels.
- The Grand Challenges in Global Health initiative engaged the world in identifying 14 specific Grand Challenges which, if solved, could lead to important advances in prevention and treatment of diseases that disproportionately affect the 2 billion poorest people on earth.
- Gordon Research Conferences (GRCs): The Gordon Research Conferences provide an international forum for the presentation and discussion of frontier research in the biological, chemical, and physical sciences, and their related technologies.

In US, there exist several initiatives aimed at defining grand challenges for computer science and its sub-fields. Some of the past challenges proposed for computer science are:

1. *Systems you can count on*
2. *A teacher for every learner*
3. *911.net (ubiquitous information systems)*
4. *Augmented cognition*
5. *Conquering complexity*

In UK, the Computing Research Committee and the British Computer Society formulated in 2005 the following challenges:

1. *In Vivo – In Silico*
2. *Ubiquitous Computing: experience, design and science*
3. *Memories of Life*
4. *The Architecture of Brain and Mind*
5. *Dependable Systems Evolution*
6. *Journeys in Non-classical Computation*

In Brazil, the Brazilian Computer Society proposed the following challenges for the period 2006-2016:

1. *Management of information over massive volumes of distributed multimedia data*
2. *Computational modeling of complex systems: artificial, natural, socio-cultural, and human-nature interactions*
3. *Impacts on Computer Science of the transition from silicon to new technologies*
4. *Participative and universal access to knowledge for the Brazilian citizen*

5. *Technological development of quality: dependable, scalable and ubiquitous systems*

### 3) Workshop Organization

The Workshop will be held in Buenos Aires, September 5 and 6, 2008. The workshop is composed of presentation and discussion sessions, organized in two stages. First, the participants will briefly (10 minutes for each participant) present their position papers. Next, attendees will be split into five working groups to discuss the proposals and consolidated them into the five challenges. Discussions are expected to identify strategies and multi-lateral Latin American research groups that could work on the challenges. In addition to scientific issues, the working groups should also consider the social and economic impact of the challenges for Latin America.

- Day 1:
  - 8:00 – 8:30 Opening session: José Carlos Maldonado and Virgilio Almeida
  - 8:30 – 9:00 Panel – TBA
  - 9:00 - 10:30 Presentation of the selected “position papers”, 10 minutes per paper (9 papers)
  - 10:30 – 11:00 coffee break
  - 11:00 – 13:30 Presentation of the selected “position papers”, 10 minutes per paper (9 papers)
  - 13:30 – 14:30 lunch
  - 14:30 – 16:30
    - Working session: organize five (5) working groups to discuss and propose a list of 5 grand challenges for computer science research in Latin America. The list of proposed challenges is not necessarily tied to the subject presented by the papers. Each group should be prepared to defend its list of grand challenges by presenting the importance and relevance of the scientific challenges for Latin America. Each group should also list what are the major obstacles to achieve the great challenges in a 5-year period of time.
  - 16:30 – 17:00 coffee break
  - 17- 19h
    - Presentation of group proposals: each group should present in 15 minutes the list of challenges, including benefits and obstacles associated with the proposed challenges. Each group should also suggest actions that will be needed to support research on the grand challenges.
- Day 2:
  - Discussion and summarization of the proposed challenges formulated in the first day.
  - Reorganization of the 5 groups, assigning one specific challenge for each group (groups in day 2 could be different from groups formed in the first day).

- Preparation of the outline of the first version of the Grand Research Challenges in Computer Science for Latin America.
- Closing session: the Program Committee will present the final proposal of the Grand Challenges in CS for Latin America.

The Program Committee will work on a document with the proposed Grand Challenges Workshop and action suggested to achieve their goals. Discussion of the slides to be presented at CLEI 2008.

#### 4. Accepted Papers – presentation schedule

1. Hector Cancela. “Grand challenges in Computer Science Research in Latin America”
2. Alfredo Viola. Information technologies to the help of citizen participation in public decisions and public education.
3. Cristina Murta. Ocupando o Próprio Território: Quem nos guia pela nossa Web?
4. Jesus Favela. Retos de la Investigación en Ciencias de la Computación en Latinoamérica
5. Orlando Loques. Como criar riqueza e desenvolvimento social?
6. Gerardo Sierra. Red Latinoamericana de Conocimiento, Información y Tecnologías del Lenguaje
7. Hans Liesenberg. ICT for Development (ICT4D): An opportunity for building technological leadership
8. Francisco Rodríguez Henríquez. Extendiendo nuestros sentidos y nuestros destinos con redes inalámbricas de sensores
9. Antonio Loureiro. Redes de Sensores sem Fio para Monitoramento de Anfíbios
  
10. J. Alfredo Sánchez. Empowering Latin America in the Knowledge Society: A Grand Challenge for Computer Science
11. Rosa Vicari, Tiago Primo, Ricardo A. Silveira, Franco Simini, Luis Guerrero, César Collazos and Demetrio Arturo Ovalle. Desafíos Tecnológicos para la Educación en AL (América Latina)
12. Mirella Moro, Alberto Laender and José Palazzo M. de Oliveira. LADS– Latin American dissemination system
13. Benjamín Barán. Interconectando a los pueblos Latinoamericanos. El gran desafío
14. Flavio Wagner, Luigi Carro, Leila Ribeiro, Luis Lamb, Álvaro Moreira, Erika Cota and Carlos Eduardo Pereira. New Technologies and their Role in Software Development and Deployment
15. Vladimir Lara and Gabriela Marin. ¿Cómo promover la investigación en Latinoamérica?

16. Vera Lúcia Strube de Lima, Maria das Graças Volpe Nunes, Renata Vieira, Sandra Maria Aluisio, Dina Wonsever and Laura Alonso Alemany. Multi-lingüismo e o Processamento de Línguas Naturais
17. Ramon Puigjaner and Bartomeu Serra. Ideas para que el mundo use mejor la tecnología
18. Jussara Almeida. Redes Complexas Dinâmicas e suas Interdependências: Caracterização, Modelagem, Análise e Aplicações na Web
19. Ellen Barbosa, Elisa Y. Nakagawa, Marcelo Turine, Débora Maria Barroso Paiva, Fabio Kon and Ivan Ricarte. Cooperative, Geographically Distributed Development of Open Educational Modules

Program Chairs: José Carlos Maldonado and Virgilio Almeida