OAS-ARTCA PROJECT

TITLE: Pan-American Advanced Studies Institute

Countries: The National Science Foundation (NSF) and the University of Illinois (United States), Guatemala (host)

Institutions: The National Science Foundation, the University of Illinois, the Organization of American States (OAS), the Advanced Research and Technology Collaboratory for the Americas (OAS-ARTCA) and the Universidad del Valle de Guatemala

Type of Institutions: Public

Other institutions involved: The Institute for Computing in Humanities, Arts and Social Science (I-CHASS) of the University of Illinois; The National Center for Supercomputing Applications (NCSA); the Extreme Science and Engineering Discovery Environment (XSEDE); the Latin American Cooperation of Advanced Networks (RedClara); application submission services provided by National University

Webpage: http://artcaonline.org/

Context

In search of solutions to the most complex challenges facing the Americas and the world at large, researchers find themselves in need to use more and more advanced technologies and computational tools in order to gather, analyze and preserve research data. Indeed, in the past decades, researchers across the natural and social sciences have generated such massive amount of data sets that nowadays, they extend well-beyond humans' capacities to understand or analyze them without using sophisticated technologies.

Therefore, it is becoming increasingly necessary that researchers from different disciplines acquire skills in advanced technologies, as well as in data acquisition and management. Namely, they require training in methods of computation-based discovery (CBD).
CBD allows researchers to use data to study large scale problems, such as:

- Astrophysics, Cosmology and the Evolution of Galaxies

- Tropical Studies

- Analysis of huge bibliographic databases or large amount of literary works

- Meteorology

- Scientific simulations

- Social Sciences: census, analysis of complex social networks, online gaming practices, among others.

In order to respond to the need for CBD training, the National Science Foundation awarded the University of Illinois, in collaboration with the Advanced Research and Technology Collaboratory for the Americas (OAS-ARTCA), a grant to design and implement the "Pan-American Advanced Studies Institute" (PASI), a ten-day Workshop, which took place at Universidad del Valle de Guatemala, in Guatemala City from July 15 to 26, 2013.

During the Institute, 30 participants – mainly graduate, post doctoral students, and junior faculty – gained foundational knowledge in data science as prominent researchers from across the Americas shared methods and techniques for CBD and offered hands-on laboratory sessions.

Participants were also encouraged to relate their knowledge on CBD to their own research, and develop mentoring relationships with the instructors.

The PASI was offered through a joint effort of five umbrella organizations: (1) the Extreme Science and Engineering Discovery Environment (XSEDE); (2) the National Center for Supercomputing Applications (NCSA); the Institute for Computing in Humanities, Arts and Social Sciences (I-CHASS) of the University of Illinois; (3) the Advanced Research and Technology Collaboratory for the Americas (ARTCA); (4) the Latin American Cooperation of Advanced Networks (RedCLARA); and (5) the Organization of American States (OAS).

Objectives

The key objectives of the PASI were to: (1) expand participants' knowledge on high performance computing and specialized tools and techniques involving massive or complex data sets; (2) provide hands-on experience in exploring large data sets using easily accessible desktop open source tools; (3) bring researchers from underrepresented populations into the CBD field; and (4) foster new collegial networks that stimulate both national and international co-operative partnerships among the presenters and attendees.

Relevance

The PASI was relevant for the training and access it provided to advanced computational resources in the U.S., as well as for the establishments of cross-country collaborations among participants.

Furthermore, by giving special attention to recruit participants from typically underrepresented groups and bring them together with experts from the US and Latin America, the course provided an experiential and collaborative learning environment as well as a unique cultural experience.

Implementation

A wide Call for Proposals was disseminated three months before the Institute took place. The Ministries and Councils of Science and Technologies in the 34 countries of the Americas were asked by the OAS to participate by recruiting activities by disseminating the information through their networks. Also, RedClara, one of the OAS´ key partners, distributed the Call for Proposals in its network of 1200 universities in Latin America. Finally, the OAS distributed the information through its national offices to recruit participants on the ground.

Participant's recruitment focused on whose research would benefit from CBD, with particular attention paid to inviting researchers from traditionally underrepresented groups (women, first nations, ethnical

groups and researchers from remote areas). The University of Illinois / NCSA team reviewed the US applications, while the OAS /OAS-ARTCA /RedCLARA team reviewed Latin American applications.

Instructors were selected for their expertise in methods of computation-based discovery and their interest in mentoring. Most of them were professors and researchers from well-known Universities, with qualifications in a wide range of disciplines such as Informatics, Astrology, Biology, Humanities, Arts and Literature. An equal representation of U.S. and Latin American presenters was also sought. In total, 10 instructors shared their knowledge through lectures, hands-on labs and group brainstorming sessions.

PASI participants also had the chance to visit the facilities of the Universidad del Valle de Guatemala, such as its chemical engineering lab, and to engage with some of the professors and researchers of the University in an effort to pursue collaborations after the Institute ended.

Key contacts involved in the design, implementation and evaluation of the project

Dr. Scott Poole, Director of the Institute for Computing in Humanities, Arts and Social Science (I-CHASS) of the University of Illinois was the Principal Investigator of the PASI while Dr. Kevin Franklin, Executive Director of I-CHASS was the Co-Principal Investigator.

The local organizing committee in Guatemala was lead by Eng. Luis Furlan, Director of the Center for Studies in Applied Informatics at Universidad del Valle de Guatemala, in collaboration with Dr. Michael Simeone, Associate Director for Research and Interdisciplinary Studies **at** I-CHASS and Ms. Aryanne Quintal, Project Coordinator of the Advanced Research and Technology Collaboratory for the Americas. Dr. Fernando Hernandez, Senior Research Fellow at I-CHASS, also significantly helped to shape the event by building the PASI's webpage.

Given the international aspect of the PASI and its numerous collaborating institutions, several guests participated in the opening ceremony, such as: Eng. Miriam Rubio, National Secretary of Science and Technology of Guatemala; Eng. Santiago Nunez-Corrales, Director of Digital Technologies of the Ministry of Science, Technology and Telecommunications of Costa Rica; Mrs. Nikola Ruth Urry, representative of the U.S. Embassy in Guatemala; Mr. Cesar Parga, Chief of the Section on Competitiveness, Innovation and Technology of the OAS, Dr. Kevin Franklin, Executive Director of I-CHASS and Mr. Roberto Moreno, President of the Universidad del Valle de Guatemala.

Instructors of the PASI included: Dr. Cinda Hereen, Professor in Computer Science at the University of Illinois (United States); Dr. Alan Craig, Senior Associate Director for Human-Computer Interaction at I-CHASS, University of Illinois (United States); Dr. José Castro, Researcher at the Computing Research Center of the Costa Rican Institute of Technology (Costa Rica); Dr. Donna Cox, Director of the Advanced Visualization Laboratory (AVL) at NCSA (United States); Mr. Robert Patterson, producer and choreographer for the Advanced Visualization Laboratory (AVL) at NCSA (United States); Dr. Luis Nuñez, Professor in Computational Physics at Universidad de los Andes in Colombia and Academic Relations Manager for RedCLARA (Colombia); Dr. Mauricio Carillo-Tripp, Associate Professor at the National Genomics for Biodiversity Laboratory of CINVESTAV (Mexico); Dr. Jaime Ernesto Forero-Romero, Assistant Professor in Astrophysics at Universidad de los Andes in Colombia (Colombia); Dr. Álvaro de la Ossa, Associate Professor in Computer Science and Cognitive Science at the University of Costa Rica and Researcher at the National Center for Advanced Technology Studies (CENAT) (Costa Rica); Dr. Richard Marciano, Professor in the School of Information and Library Science at University of North Carolina at

Chapel Hill (United States).

Finally, Dr. Linda Vigdor, Researcher, Evaluator and Writer at University of Illinois was in charge of producing the final evaluation report of the PASI to be presented to the National Science Foundation. Dr. Vigdor sent electronically pre and post-surveys to all participants in order to collect information on their expectations prior to the PASI and their appreciation and suggestions after the Institute ended.

Good practices and concrete lessons

1. The materials developed for the PASI are publicly available on the Institute's website.

2. The creation of cross-disciplinary and multilateral collaboration teams of young researchers and highly qualified instructors interested in studying large scale problems using advanced technologies.

3. A Second Edition of the PASI in another country of the Americas in 2014 is planned to expand the network and provide training on key issues for participating countries.

Recommendations

1. The second Edition of the PASI should be centered on Modeling and Visualization as key advanced technology areas. Next Editions of the PASI should also align their content with the priorities of the countries in terms of science, technology, entrepreneurship and innovation.

2. Invite experts in advanced technologies from the private sector to explain what type of implications knowledge in "Computational Based Discovery", in "Modeling" or in "Visualization" can have on the economic and social development of the Region.

3. Concrete examples of how advanced research techniques can be used outside of the academic world should also be part of the PASI curriculum.

Human and institutional capacities to share this experience with other institutions from member countries of the RIAC

The organizing institutions of PASI are willing to share this experience with the member countries of the RIAC in many ways:

- Sharing of information
- Visit from experts
- Videoconferences
- Journalistic and scientific articles
- Peer review

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