

PIRE: A Global Living Laboratory for Cyberinfrastructure Application Enablement

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Other Institutions: Barcelona Supercomputing Center (Spain), IBM Research (China, France, India, Japan, USA), Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico), Tsinghua University (China), University Nacional de La Plata (Argentina), Universitat Politècnica de Catalunya (Spain)

I. Motivation - Goals - Challenges

Motivation

– Engage top computer science students, especially underrepresented minorities, in a unique and large-scale international partnership through an innovative research model.

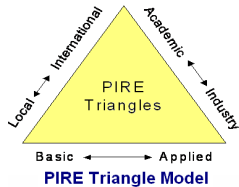
Goals

- Increase participation of students in computing research and expand their global perspective.
- Increase the number of students entering computing graduate programs.
- Increase the number of minority Ph.D.'s entering the professoriate.

Challenges

- Motivating students who have never lived away from their families.
- Finding enough number of students to participate in this program.
- Unexpected complexities of living abroad and differences in cultures.

II. Student-Centric Model



PIRE Triangles ensure that each participant will receive multiple perspectives in each of three different aspects of collaboration as they work

1. with local and international researchers
2. in academic and industrial research labs
3. on basic and applied research projects.

III. Research Projects

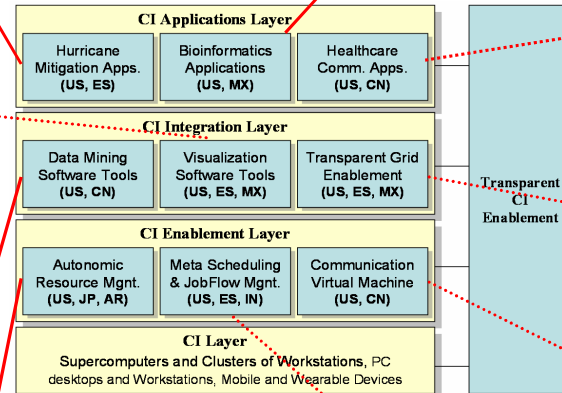
FIU IBM Barcelona Supercomputing Center Universidad Politécnica de Catalunya
Mitigate impact of hurricane landfalls by providing accurate and timely information to enable effective planning.

FIU IBM Barcelona Supercomputing Center Universidad Politécnica de Catalunya
Design tools that enable (1) the creation of a transparent network between the users and the distributed locations where the data is situated, and (2) the visualization and rendering of distributed large data volumes, since only the reduced data sets and/or the discovered data/features need to be transferred across the network.

FIU IBM FAU Universidad Nacional de La Plata
Design algorithms for analyzing large amounts of spatial and/or temporal data and develop software toolkits that can apply these algorithms for mining domain-specific data.

FIU IBM Universidad Nacional de La Plata
Support CI applications with robust and self-regulating mechanisms for resource management. These mechanisms provide high-level quality-of-service (QoS) support for application execution on top of CI that has heterogeneous resources with different computation, storage, and network performance parameters.

FIU IBM FAU Ica UPC Universitat Politècnica de Catalunya
Model and analyze biological systems, especially systems involving genetic material, to understand the root cause of several disorders and diseases in human body.



Relationship among the different projects. The International Country Codes are used to indicate the countries involved in each project: **US:** USA, **ES:** Spain, **MX:** Mexico, **CN:** China, **JP:** Japan, **IN:** India, and **AR:** Argentina.

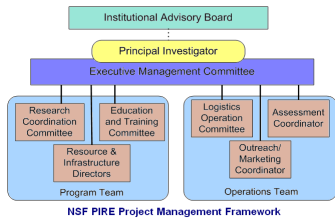
FIU IBM FAU UPC Universitat Politècnica de Catalunya
Support CI applications with resources located and managed in different logical and/or physical domains through the use of meta-scheduling and job flow management techniques.

FIU IBM Barcelona Supercomputing Center Universidad Politécnica de Catalunya
Develop a solution for communications that not only involve different media, e.g., voice, video, text, and images, but also need to follow certain workflow processes, ensure patient privacy, and allow exchange of data from distributed sources and medical information systems.

FIU IBM Barcelona Supercomputing Center Universidad Politécnica de Catalunya
Address the lack of an appropriate programming model for developing grid-enabled cyberinfrastructure applications.

FIU IBM FAU Universidad Nacional de La Plata
Develop a CI-transparent communication technology that will support the automatic generation of communication solutions. CVM represents a paradigm shift on how communication applications are conceived and delivered.

IV. Project Management



Executive Management Committee (EMC) - Oversees all aspects of the PIRE project, leads research and educational activities and is responsible for the execution of the collaborative teams and the overall program outcomes.

Research Coordination Committee - Drives the PIRE research agenda, identifies obstacles, potential research directions, and new approaches with researchers from international sites.

Education and Training Committee - Oversee the career development of PIRE faculty and students, making certain that the PIRE initiatives to engage participants with international collaborative research experiences work smoothly.

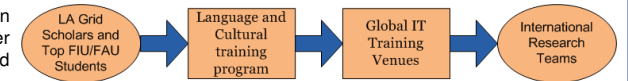
Resource and Infrastructure Directors - Is responsible for coordination and operations of the computing resources associated with PIRE CI, including the collaborative tools, website, and distance learning/conferencing.

Operations Team - Coordinates the logistics of student training and travel, the assessment of the project, and the dissemination of PIRE results. These coordination activities will be reviewed by the EMC so that they are aligned to fully support the research agenda and career development activities.

V. Student and Faculty Engagement

▪ Students collaborate locally and abroad on international research projects, publish peer reviewed articles, and obtain relevant industry and academic experience and contacts.

▪ Faculty members strengthen their research collaborations and pool resources from international partners to tackle large-scale research problems. PIRE research will be presented in courses taught by PIRE faculty members and graduate students. By disseminating these experiences to students not involved in the PIRE project, we will generate a great deal of interest in research and in our international program.



VI. Evaluation – Success Criteria

- ✓ Quality of implementation of each of the PIRE activities, as well as the overall quality of the program.
- ✓ Impact of the activities on the attitudes, beliefs, and behavioral intentions of undergraduate and graduate students about pursuing research career opportunities in computing.
- ✓ Impact of the program on the number of students who seek and maintain academic jobs.
- ✓ PIRE experiences of some students, shared through our dissemination mechanisms impact on computing students not directly involved in PIRE in terms of their attitudes toward research, international collaboration, and careers in computing.
- ✓ Long-term impact PIRE experiences have on participants' careers.