

CHEPREO
External Advisory Committee Report
September 20, 2004

Introduction

The Annual Meeting of the External Advisory Committee of CHEPREO met at Florida International University on Friday, July 23, 2004. In attendance at the meeting (or via video) were the Principals of the Project as well as the FIU Dean of Arts and Sciences, Chair of the Physics Department, and associated faculty, staff, and graduate and undergraduate representatives from several FIU Departments.

Presentations to the committee covered the various aspects of CHEPREO as well as other allied programs particularly in information technology and networking. From these, the committee was able to draw this very clear impression of CHEPREO – it is a significant program interrelating particle physics, computer science, and education and outreach, all intertwined at one location – FIU.

With the project just in its second funding year, the programs are still very much in the formative stage. In particle physics, new hires are building the group's participation in the CMS experiment at the CERN LHC with important responsibilities for the slow controls (DCS) system for the detector. In information technology, new membership in iVDGL, participation in Florida Lambda Rail, and development of high bandwidth networking to South America are centerpieces of the group's efforts. Expanded collaboration with the FIU Computer Science Department is being explored. In education and outreach, foci include a QuarkNet Center (now in its second year), and a comprehensive instructional Modeling Program (based upon the Arizona State program of Hestenes, et al) with summer workshops for high school teachers, graduate and undergraduate students, and academic year courses in introductory physics which embrace the Modeling Method. A new hire in the area of physics education research will take this even further.

CHEPREO neither invented nor pioneered CMS DCS, Grid and Networking, QuarkNet, or Modeling. So what then is the significance of its contribution? Answer: CHEPREO should be viewed as an experiment whose technical merit is bridging between these different projects at a single institution with the potential (and promise) of major "broader impacts". Sited on the FIU campus in South Florida, it is positioned to form bridges among these varied programs with potential for new directions and opportunities in research and education, particularly for non-traditional participants.

The committee was most impressed with the diversity of the activities and commends the project for its strong and enthusiastic start. There is really a lot to like in this program.

Committee Discussion Points:

After hearing the presentations and responding interactively, the committee formed its impressions of the program and formulated several discussion points that were presented at the time of the closeout. Not necessarily in order of importance, these were posed more in a “stream of consciousness” mode of thinking by the committee. The committee does not expect to receive directly answers to the questions posed below in the near term, but would value a response at the time of the next meeting. Rather the framing of responses internally among project participants over the coming months may help guide CHEPREO structurally and operationally.

I. Year 3 of the program will be important for program funding renewal, and the committee is keen that CHEPREO fare well in this review.

- ⌚ What are the pivotal program milestones for Year 3, and additionally what are the key elements to motivate and allow successful project continuation?
- ⌚ Is the funding plan sufficient to meet the program objectives in later years, now from the vantage point of two years of program operation?
- ⌚ Does CHEPREO have a dissemination plan, so that it can serve as a model or inspiration for others?
- ⌚ Is the program over-reviewed or under-reviewed by NSF, or is the frequency of reviews considered adequate and beneficial to the project managers?

II. Given the interdisciplinary nature of CHEPREO, faculty and staff hires are critical to effective program building.

- ⌚ Several of the new positions are hires on NSF funds with the understanding that these will be converted to other sources (such as university funds) after 3 years. Since these hires are distinct from traditional tenure-track faculty hires, what are longer-term prospects for promotion to tenure for these individuals?
- ⌚ In the case of positions that cross traditional department boundaries, such as physics education research, what are the understandings on tenure decision for these individuals? These interdisciplinary activities are natural places to develop new career pathways for students, and to make an investment here will require extra care to support knowledgeable faculty.
- ⌚ There appears to be a developing relationship between Physics and Education Departments on the FIU campus. Since IT is an important aspect of CHEPREO, is there a similar plan for developing a stronger relationship between Physics and IT Departments on the campus? Such bonds could also lead to potential new majors and career paths.

III. The Committee was introduced to a new initiative called the Physics Learning Center (PLC), a facility which has laboratory and meeting spaces that are significant to improving the scientific education of students at a variety of levels. The committee would like to encourage its rapid completion, so that it will be available for program in the near term as well as later years of this program.

IV. Organization and Structure:

- ⌚ How is the project organized and how are priorities established, project milestones developed and followed, and programmatic conflicts and opportunities addressed? An “Org Chart” would be helpful.
- ⌚ CHEPREO is all about integration. Given the several facets of the program, it would be beneficial particularly for external reviewers to have a more focused (or structured) organizational perspective, so that outsiders (particularly project evaluators) can assimilate the different components, their relationships and synergies. Superficially, CHEPREO consists of several elements that might not necessarily be related or integrated at all. CMS/DCS is a distinct programmatic effort, as are many of the aspects of computer technology, infrastructure and networking. The Modeling program in education and outreach is similarly stand-alone. Improved clarity in program structure and operations could be helpful.

V. Outcomes and Broader Impacts: It is here that CHEPREO has the potential to really shine, and getting “after it” now will help strengthen the case for project support for the future, perhaps from a variety of sources including the NSF. Examples:

- ⌚ The networking bridge to Brazil certainly benefits the communication links within in the Americas and elsewhere and the CMS and DØ experimental programs in particular. It is less clear how this opportunity will serve FIU and Brazilian University interactions in terms of student, teacher, and faculty/staff exchanges. A significant opportunity for experimental and educational exchanges can result and would be an important outcome. Formulation of a vision here will help shape the program in future years.
- ⌚ Modeling for the high school classroom is being extended, very effectively, to FIU undergraduate classes through the efforts of this program. With support from the College of Education and the new hire sited above in Physics Education Research, the potential exists for a new degree program for undergraduate and graduate students, building upon interconnections and interests among faculty and staff from several different departments. Further linkages between the College of Arts and Sciences and the College of Education may be necessary to build this opportunity.
- ⌚ With the establishment of Modeling workshops and the connectivity they create with teachers and students, it would be good to advance linkages between these new program participants and the FIU research programs in the sciences, information technology, and education. During the advisory board meeting, the committee was given time to observe Modeling Workshops involving high school teachers, graduate and undergraduate students, covering Newtonian Mechanics (Modeling I) and Optics (Modeling II). These sessions and the full-group luncheon were excellent opportunities for committee members to talk informally with session participants. It is clear from these informal interactions that tremendous good will has emerged and strong bonds have been established between teachers, students and faculty. To capitalize on this with research opportunities for some of the participants would be significant opportunity.

Obviously, the above comments are suggestions only. There may be other themes of significantly greater merit than these that will emerge. But the basic point is to work hard at the broader impacts that can (and will) result. These will help sustain CHEPREO into the future and might form the basis for new opportunities.

Lastly, the committee thanks CHEPREO staff, teachers and students and FIU Officials for their hospitality during the review.

Respectfully submitted,

Maxine Brown, David Jones, Jenny Oren Krugman, Brian Meadows, Randy Ruchti
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