Technical Report UTEP-CS-05-22
Consortium of CISE-MII Funded Institutions
Initial Recommendations on Broadening
Participation of Hispanics

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1 Introduction

Over the last fifteen years, a number of Hispanic Serving Institutions (HSIs) have been funded through the Computer and Information Sciences and Engineering (CISE) Minority Institution Infrastructure (MII) program to develop research infrastructure and build human capital, in particular in the area of recruitment and retention of Hispanics at all educational levels. A consortium of MII-funded institutions (refer to Appendix) is proposing the formation of the Computing Alliance of HSIs to create a coordinated effort that identifies and promotes innovative approaches and disseminates effective practices to increase the number of Hispanic students who pursue and complete advanced degrees in the CISE areas and assume leadership roles in computing. By working as a group, the efforts of HSIs will be more deliberate, focused, and effective.

A motivating factor for creating the Alliance is that the latest population projections and immigration trends indicate that the greatest growth among minority groups is projected for Hispanics and Asians/Pacific Islanders [NSF04-317]. However, the number of Hispanics who choose computing areas as their field of study is not comparable to the rate of Hispanic population growth. NSF's Strategic Plan FY 2003-2008 recognizes the importance of fully engaging people from under-represented groups and institutions in order to maintain our nation's global leadership in computing.

NSF report, *Women, Minorities, and Persons with Disabilities in Science and Engineering* [NSF04-317], states that minorities are expected to be more than half (52 %) of the resident college-age (18–24 years old) population of the United States by 2050. According to the 2002-2003 Taulbee Survey, Hispanics constitute 1.2% and Native Indians/Alaskan Natives are 0.2 % of total enrollment in Ph.D. programs in CS & CE. Many of the funded programs have made a difference in the number of students graduating in baccalaureate programs in science, technology, engineering, and mathematics (STEM) areas, but the full impact from bridging to doctorate programs will not be seen for at least ten years.

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The purpose of this document is to describe the proposed Alliance and present initial recommendations to the National Science Foundation as it begins to examine broadening participation initiatives.

2 Proposed Alliance

The inspiration for the Alliance comes from the need for a grassroots effort to unify and strengthen computing research and education among HSIs. The inspiration for its organization comes from the National Center for Women in Information Technology.

The Alliance will provide direction in computing for initiatives that address the under-representation of Hispanics, dissemination of best practices, and development of future Hispanic leaders. In addition, it will foster a community that can share resources, establish collaborations in research and education, and provide support to partner institutions. The goals of the Alliance align with those of NSF as stated in its Strategic Plan FY2003-2008:

- People Goal--a diverse, competitive, and globally-engaged U.S. workforce of scientists, engineers, technologists and well prepared citizens;
- Ideas Goal--discovery across the frontier of science and engineering, connected to learning, innovation and service to society;
- Tools Goal--broadly accessible, state-of-the-art S&E facilities, tool and other infrastructure that enable discovery, learning and innovation.

Adequately addressing the participation of Hispanics in the science and engineering workforce requires a *long-term and sustained investment* as well as direction that the Alliance can provide.

2.1 Core Purpose and Goals

The core purpose and goals were defined in an August 2004 meeting in San Diego. The *core purpose* of the Alliance is as follows: to create a unified voice and to consolidate the strengths, resources, and concerns of the alliance institutions that are committed to increase the number of Hispanics who pursue and complete baccalaureate and advanced degrees in computing areas. The core purpose provides the fundamental reason for the Alliance's existence and serves to guide and inspire the organization. The Alliance's core purpose was defined to be broad and enduring.

The *goals* of the Alliance divide into four interrelated areas: students, faculty, research, and public. The Alliance believes that to make a difference in the number of Hispanics who choose careers and assume leadership roles in computing requires the following:

1. the recruitment, retention, and advancement of Hispanic faculty into leadership positions and
2. the development of competitive research programs at HSIs.

This is supported by the National Science Board (NSB) report on broadening participation in science and engineering research and education [NSB-04-41] that states that the percentages of tenure-track faculty at post-secondary institutions is significantly lower than the percentage of students from underrepresented minority groups at these institutions, and that low numbers of underrepresented minority S & E faculty impede the recruitment and retention of underrepresented minority students in S & E programs.

The public goals center on the education, awareness, and advocacy of the roles of HSIs and the need to support student, faculty, and research initiatives. Change requires promotion of knowledge and understanding of the issues and challenges that face Hispanic students, faculty, and institutions. This requires coordination with existing organizations' lobbying efforts and support of congressional delegations.

The Alliance will provide direction in computing for initiatives that address the under-representation of Hispanics, dissemination of best practices, and development of future Hispanic leaders. In addition, it will foster a community that can share resources, establish collaborations in research and education, and provide support to partner institutions. The Alliance has the potential to increase the global impact through existing and developing partnerships with Latin American and Caribbean countries. The goals of the Alliance are to *coordinate activities and identify effective practices* that support the following:

Students
- Increase the number of K-12 Hispanic students who choose a career path in computing
- Increase the number of Hispanic students who are recruited and retained in computing programs
- Increase the number of qualified Hispanic students who can enter advanced degree programs

Faculty
- Increase the number of faculty who take leadership roles in research and education of Hispanics.
- Increase the number of Hispanic faculty who are recruited and retained, and who advance in the field.
- Increase the number of Hispanic faculty at HSIs.

Research
- Build competitive research programs at HSIs.

- Increase the number of competitive Hispanic researchers, in particular at HSIs.

Education, Awareness and Advocacy
- build and sustain competitive degree programs at HSIs
- advance public knowledge and understanding of the issues and challenges that face HSIs
- define strategies to influence federal, state, and corporate initiatives in student aid and funding of scientific research at HSIs

2.2 Organization

The proposed organization of the Alliance is given in Fig. 1. The Alliance brings together HSIs that are committed to increase the number of Hispanics in computing. An Executive Board will oversee the Alliance activities and coordinate interactions of Alliance members. An external Advisory Board will set direction. Based on membership reports and analysis of data, the Advisory Board will make recommendations to the Alliance regarding current and new initiatives, funding, and concerns. The organization of the Board has not been finalized. It is anticipated that the Alliance will meet twice a year.
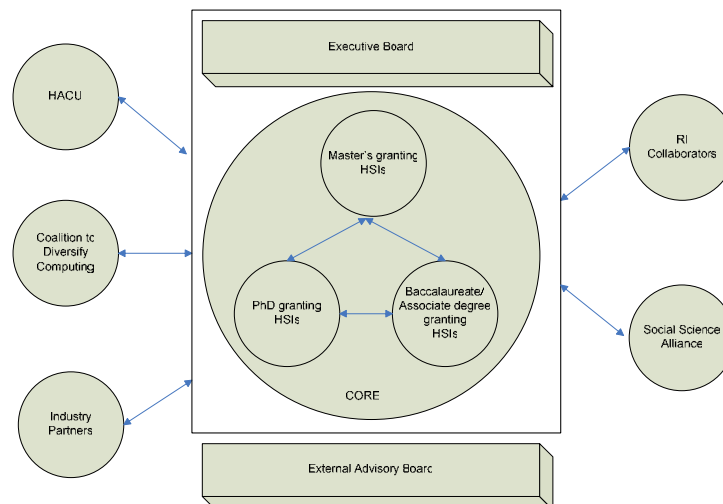
Fig 1: Proposed organization of the Computing Alliance for Hispanic-Serving Institutions

The Alliance will include faculty at Research Institutions (RIs) who share the core purpose of the group and who will work at establishing collaborations with HSIs. The Social Science Alliance is a core of social scientists and others who study the recruitment, retention, and advancement of Hispanic students and faculty. The Alliance will work with national efforts such as the Hispanic Association of

Colleges and Universities (HACU), Computing Research Association (CRA) Coalition to Diversify Computing, and others that share its mission. Organizations, e.g., CRA, University Space Research Association, Latin American and Caribbean Consortium of Engineering Institutions, IEEE-Computer Society, National Center for Women in Information Technology, and ACM, will be invited to participate when the Alliance establishes itself. Similarly, the Alliance will invite industry partners that support and promote diversity initiatives.

3 Alliance Initiatives

Together the alliance institutions can become as strong as any majority institution. The combined resources of the Alliance will strengthen individual institutions. Examples of Alliance initiatives include:

- faculty loan programs with a focus on improving faculty expertise in specialized areas;
- faculty development programs, for example:
    - o visiting faculty programs that could launch training at host institutions;
    - o collaborative Ph.D. programs in which faculty of alliance institutions, who do not have Ph.D.s, study at Alliance Ph.D. granting institutions; and
    - o mentoring of junior Hispanic faculty at all institutions
- creation of cyber-communities of researchers and educators to collaborate on:
    - o proposal writing
    - o course development and delivery
    - o thesis committees
    - o cross-institutional degree programs
- creation of a repository of effective practices and their delivery with the purpose of mentoring Hispanic students
- promotion of research to identify key data points regarding Hispanic student retention, advancement, and performance, including investigating why student choose computing and why they leave and assessment and evaluation of existing programs at HSI institutions.

4 Recommendations

Broadening participation of Hispanics requires sustained investment in the development of HSI graduate programs, faculty, student, and infrastructure. HSIs play an important role in increasing the number of students who choose computing as a career and continue to graduate school. Indeed, Ph.D. granting HSIs are key to improving the number of Hispanics who enter the professoriate. Funding is essential to sustain the quality of research and education at these institutions and to establish collaborations that broaden students' research experiences. In addition, increasing the number of Hispanic faculty who can serve as role models is critical as described in Section 2.1. HSIs must be able to put together an attractive faculty package in order to attract qualified Hispanic

faculty. The thin spread of resources makes this problematic, creating, then, a classic Catch-22: it is difficult to recruit good faculty when the funding of programs such as CISE MII is being cut, and HSIs cannot compete for regular funding without good faculty.

The recommendations of the consortium are to provide funding to:

1. build and sustain strong graduate programs at HSIs, such as the HBCU RISE and Centers of Excellence programs;
2. support graduate research fellowships and provide Hispanic graduate students with educational and research experiences at other institutions;
3. support undergraduates who are involved in research;
4. recruit, retain, and advance Hispanic faculty, in particular those at HSIs;
5. enhance professional development of faculty at HSIs who involve Hispanic students in research;
6. support faculty planning time to conduct preliminary research for proposal development;
7. sponsor authentic RI-HSI research collaborations that are partnerships between equals; and
8. build technological and human infrastructure.

5 Concerns

The consortium partners believe that the following concerns must be addressed in order to broaden participation effectively:

1. Accountability. Accountability falls into two categories. One is the funded institution that receives money to advance the cause of Hispanic students and faculty. The second is the institution that receives funding in partnership with HSIs. Mechanisms need to be in place to monitor fund usage.
2. Merit review system and advocacy. It is essential that there be fairness in the merit review system, especially in programs in which RIs and minority institutions compete. It is our belief that pre-judgment and lack of knowledge concerning the capabilities of minority institutions makes the merit review biased unless strong advocates are present. We are not convinced that involving faculty from minority institutions on panel reviews is enough to solve the problem.
3. Pedigree problem. Three fallacies exist: a) it is imperative that minorities attend an R1 institution for their Ph.D. in order to have credibility; b) faculty at minority institutions are not capable of conducting quality research; c) students and faculty are at minority institutions because they were not accepted at another institution. Clearly this plays into peer review and funding decisions. The consortium recognizes the importance of promoting a new model of thinking that is devoid of these fallacies.

4. Collaborations. Genuine partnerships are not built over proposal writing; they are built over time and require mutual respect.

6 Summary

This document was created at the October 17-18, 2004 planning meeting held by a consortium of HSIs. It describes the proposed Computing Alliance for Hispanic Serving Institutions that will create a unified voice and consolidate the strengths, resources, and concerns of institutions that are committed to increase the number of Hispanics who pursue and complete baccalaureate and advanced degrees in computing areas. In addition, the document sets forth recommendations for funding and outlines concerns of the consortium. The consortium is creating a more comprehensive document that will profile the participating institutions, present data to support the claims in this document, and detail the recommendations and concerns.

Acknowledgements

The consortium would like to thank Dr. Alex Ramirez, HACU's Executive Director of Information Technology Initiatives, for hosting the meeting, arranging the meeting room at the HACU conference hotel, and contributing to the discussions.

Appendix

Table 1 gives the contact information for the individuals who participated in one or both of the planning meetings (August 9, 2004 and October 17-18, 2004).

Table 1: Planning meeting participants.

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Note: Kleanthis Psarris from the University of Texas San Antonio was not able to attend the meetings, but he belongs to the consortium.