Physics Programs at HSIs: A Report to the Community

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The Conference

On January 5, 2018 the National Society of Hispanic Physicists (NSHP) and the American Association of Physics Teachers (AAPT) hosted a conference on Enhancing Undergraduate Physics Programs at Hispanic-Serving Institutions (EUPP-HSIs) in San Diego just prior to the AAPT Winter 2018 meeting.

http://www.hispanicphysicists.org/eupphsi/
Notes

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Conference on
Enhancing Undergraduate Physics Programs
at Hispanic Serving Institutions

January 5, 2018
San Diego, CA

Conference on
Enhancing Undergraduate Physics Programs
at Hispanic Serving Institutions

Against the backdrop of the joint meeting of the American Association of Physics Teachers and the National Society of Hispanic Physicists, representative faculty from Hispanics Serving Institutions (HSIs) will gather to discuss the challenges and opportunities of teaching physics at HSIs.

The goal of the EUPP-HSI conference will be to generate a “state of the discipline” of physics education at HSIs; to articulate the challenges and opportunities of physics education (and STEM education in general) at HSIs; and to develop a set of recommendations for physics departments, professional societies, and funding agencies with respect to educational pedagogy, resources, and professional development programs.

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The Need for the Conference

In 2015, HSIs enrolled more than 60% of the Hispanic-American college and university students.

However, the 472 HSIs make up only 14% of the non-commercial college and university students in the US.

But there were 323 emerging HSIs that could change the fraction of HSIs to 23%.
The Need for the Conference

Though HSIs have large numbers of Hispanic American students, most HSIs also enroll large numbers of both majority and other minority students.

Today’s HSIs are models of tomorrow’s richly diverse, multicultural, multiracial colleges and universities.
Goals for the Conference

• Bring together physics faculty from representative HSIs to discuss the challenges and opportunities of physics education at HSIs

• Explore what resources exist to enhance physics programming at HSIs

• Determine what resources and programs need to be developed

• Articulate the role of professional societies in faculty development at HSIs.
Goals for the Conference

The outcomes of the conference were expected to be comprehensive, complex and multi-faceted.

But the principle value of the conference may well have been the opportunity for physics faculty from diverse HSIs to come together to discuss their experiences and needs.
Pre-Conference Preparation

Prior to the EUPP-HSI conference, participants were asked to complete a survey intended to develop a detailed understanding of the “state of the community” in physics education at HSIs.

The organizing committee selected six “Foundational Reports” to construct a cognitive/epistemological framework for physics program review and development. These reports were chosen for their comprehensive investigation into curricular and program development, for the extent and variety of their suggested practices, and the common, unifying themes of their conclusions.
Foundational Reports

SPIN-UP Final Report

SPIN-UP TYC Final Report
A NATIONAL SYMPOSIUM ON BEST PRACTICES FOR
STUDENT ACHIEVEMENT IN SCIENCE, MATHEMATICS,
ENGINEERING, AND TECHNOLOGY IN TWO-YEAR
HISPANIC-SERVING INSTITUTIONS (HSIs)
http://www2.estrellamountain.edu/nca/resources/criterion3/
NSF_EMCC_Symposium_Best_Practices_%20Report.pdf
Foundational Reports

AAS

Increasing the Number of Underrepresented Minorities in Astronomy at the Undergraduate, Graduate, and Postdoctoral Levels (Paper I)


Increasing the Number of Underrepresented Minorities in Astronomy Through K-12 Education and Public Outreach (Paper II)

http://arxiv.org/abs/0903.4507
Foundational Reports

*Excelencia in Education*

Finding Your Workforce: Latinos in Science, Technology, Engineering, and Math (STEM)

http://www.edexcelencia.org/research/workforce/stem

What Works in Higher Education

http://www.edexcelencia.org/research/what-works-series
Pre-Conference Survey

The survey included questions on …

- programs targeting STEM student recruitment, retention and acclimation;

- professional development of faculty and mentors at HSIs;

- participation of HSI faculty in professional societies;

- educational practices in physics at HSIs;

- the role of undergraduate research and internships at HSIs;
Pre-Conference Survey

The survey included questions on …

the familiarity of the departments with reports containing suggested practices for improving physics curricula and student support programming;

and the participation of HSI students in meetings of the professional societies, particularly advocacy societies.
The Conference

The conference brought together 32 participants for a day of discussions, and strategic re-envisioning of undergraduate physics education at HSIs.

The attendees represented nine universities, eight two-year colleges, five liberal arts colleges, and four primarily undergraduate state schools.
The Conference Schedule

The opening plenary was given by Thomas Brown, former Dean of Advising Students/ Special Programs at Saint Mary’s College of California, and an advisor on issues of diversity and inclusion in higher education.

- Framed the current situation of STEM education at HSIs
- Outlined the known strategies and practices to improve representation of minorities in STEM education
The Conference Schedule ii

The primary portion of the conference was based on a series of small group discussions to address …

- What are the challenges to STEM education at an HSI?
- What are the opportunities for STEM education at an HSI?
- Why should majority institutions and industry form partnerships with HSIs?
- What are the institutional barriers to improving STEM education at HSIs?
- What can professional societies do to promote, sustain and expand STEM education at an HSI?
The Conference Report

• Provides a snapshot of the “state of the community” on physics programs and resources at HSIs.

• Articulates the challenges confronting the teaching, learning and mentoring of physics at HSIs.

• Suggests practices of physics teaching, learning and mentoring at HSIs.

• Summarizes a list of recommendations for program change initiatives for physics departments, professional societies, and funding agencies.
Suggested Practices

For faculty …

• Recognize that the professional expectations of the faculty have grown increasingly complex and faculty need to continue developing professionally to meet these increased expectations.

• Pursue opportunities for professional development and incorporate a plan of ongoing professional development.

• Use professional societies to develop professionally and to become a member of the larger physics community.
Suggested Practices

For faculty …

• Study and utilize multiple effective pedagogies in order to be able to respond flexibly to the needs of a variety of students, particularly Hispanic students.

• Learn how to become an effective mentor for a diverse student population.

• Understand and employ assessment for curricular and extra-curricular programs.

• Use the resources of the college.
**Suggested Practices**

For physics departments …

- Recognize the value of the diverse contributions of faculty to the departmental program.

- Build community environments for faculty.

- Develop and implement a plan to recruit, retain, and acclimate a diverse student population.

- Provide opportunities for faculty professional development.

- Build vertical and horizontal bridges to extend the resources and community of the department.
Suggested Practices

For colleges and universities …

• Recognize the multiple facets of faculty contributions.

• Change perspective from “Are the students ready for college?” to “Are we ready for the students?”

• Provide services to assist a diverse student population to be successful.
Suggested Practices

For professional societies …

• Coordinate, inventory and promote existing and new opportunities for professional development.

• Enhance the availability of professional development resources, workshops and sessions strategically.

• Advocate for the professionalization of the professoriate.
Suggested Practices

For professional societies …

• Improve access for new and early career faculty to the society’s resources.

• Help departments make connections and build bridges to other institutions and to other disciplines.

• Provide programs to address a diverse faculty and student population.
Suggested Practices

For funding agencies …

• Recognize and promote the multiple facets of faculty contributions.

• Fund opportunities for faculty to pursue professional development.

• Encourage professional societies to develop new opportunities for professional development.
Suggested Practices

For funding agencies …

• Encourage and expect departments to develop bridges between institutions and among disciplines.

• Recognize the need for and fund initiatives that address diverse faculty, student, and institutional needs.
Notes

NSF - Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program)

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505512&org=EHR&sel_org=EHR&from=fund