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University of Houston-Downtown Freshman Enrichment Program <http://www.uhd.edu/prep> (713) 221-8207



Center for Computational Sciences

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HOUSTON PREFRESHMAN ENRICHMENT PROGRAM

*Celebrating 20 Years of Existence
Celebrating 20 Years of Minority Student Advancement
Celebrating 20 Years of success*



Dr. Richard Aló, Houston PREP Director and Ms. Sangeeta Gad, Houston PREP Coordinator with Houston PREP faculty

Through the Houston PREP Program, the Center for Computational Science and Advanced Distributed Simulation (CCSDS) is doing its part to respond to the dwindling number of students entering careers in Science, Technology, Engineering, and Mathematics, which are occurring on a national scale. Notably, the increasing number of economically and socially disadvantaged groups in our population are not looking to these fields as viable options. Houston PREP is designed to encourage students from these groups to follow these career opportunities. Moving forward into the next century without such efforts, our nation is risking its leadership role in the high technology society that we have developed.

Richard A. Aló, Executive Director
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American Indian Higher Education Consortium
Hispanic Association of Colleges and Universities
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Galena Park Independent School District
Florida International University (FIU)
Houston Community College (HCC)
Houston Independent School District
Houston Museum of Natural Science (HMNS)
International Business Machines (IBM)
Laboratorio Nacional de Informatica Avanzada (LANIA), México
National Computational Science Alliance (NCSA)
Southern Polytechnic State University (SPSU)
Swiss Federal Institute of Technology at Lausanne (EPFL), Switzerland
TexPREP at the University of Texas - San Antonio
Universidad Nacional Autónoma de México, (UNAM), México
San Diego Supercomputer Center (SDSC)
University of Colorado - Boulder
University of Texas - El Paso (UTEP)
Virtual Environment Technology Laboratory (VETL), NASA/JSC
Universidad de Puerto Rico-Mayaguez
Grants
Department of Education - GEAR UP
Ford Partnership for Advanced Studies
NSF Louis Stokes Alliance for Minority Participation
NSF - CI-TEAM Implementation Project: Minority Serving Institutions CyberInfrastructure Empowerment Coalition (MSI-CIEC)
NSF BPC - Alliance for Advanced Computing
Bridges education
NSF BPC - Promoting Women to Professoriate
NSF Computer Science, Engineering, and Mathematics Scholarships Program (CSEMS)
U.S. Office of Naval Research (ONR)
Projects - Scholarships
Army Research Office - Undergraduate Fellowship
Biology and Computer Science
Houston Alliance for Minority Participation
HACU - FordPAS, Undergraduate Internship
Projects - Research
Ford Partnership for Advanced Studies Computer Science Module Building
Houston Alliance for Minority Participation
National Science Foundation BPC; Alliance
National Science Foundation CI-TEAM
Projects - Outreach
Houston Freshman Enrichment Program
Peer Led Team Learning
Saturday Academy
Saturday Computational Science Academy

GOALS AND PURPOSE

The Houston Prefreshman Enrichment Program (Houston PREP) is an academically intense, mathematics-based summer program, which stresses the development of abstract reasoning and problem solving skills.

The purpose of the program is to identify achieving middle and high school students with an interest in science, technology, engineering and other mathematics-related areas, and to increase their potential for careers in these fields.



Third year PREP students receiving their Diplomas in the PREP Graduation Ceremony

Also, the goals of the program are to increase the number of competently prepared students from Texas who will ultimately pursue science, technology, engineering, and mathematics studies in college and to increase the retention rate of these students as they progress through college by:

- ✓ Acquainting these students with professional opportunities in engineering;
- ✓ Reinforcing the academic preparation for these students at the secondary school level, and;
- ✓ Creating an environment in which talented students are encouraged to learn, explore, achieve, and discover.

HISTORY of TexPREP and Houston PREP

The TexPrefreshman Engineering Program was founded in 1979 by mathematics professor, Dr. Manuel P. Beriozabal, at the University of Texas at San Antonio. Replication of San Antonio PREP began in 1986 with sites throughout the state of Texas (TexPREP). Since 1997, with a grant award from NASA, PREP continued its replication in Hispanic-serving institutions nationwide. In 1989, Dr. Richard A. Aló brought TexPREP to Houston at the University of Houston-Downtown, naming it Houston PREP.

ACADEMIC PROGRAM

The mathematics-based program, approximately seven weeks in length, is presented over the course of four summers to students entering grades seven to ninth. The Texas Education Agency has authorized participating school districts in the state of Texas to award one elective credit toward high school graduation for each successfully completed summer of Houston PREP. In addition, students graduating from Houston PREP are eligible for scholarships at UHD.



Second year PREP students working on their physics assignment, and third year students working on their Computer Science projects

Academic Curriculum

First Year

Logic and its Applications to Mathematics
Introduction to Engineering
Introduction to Computer Science (Visual Basic)
Computational Science/Problem Solving

Second Year

Algebraic Structures/Linear Algebra
Engineering
Introduction to Physics

Third Year

Introduction to Technical Writing
Introduction to Probability and Statistics
SAT Math
Computer Science (HTML)

Fourth Year

Robotics
Career Awareness Seminars
Intro. To Calculus
Computational Science

PROGRAM RESULTS

Follow-Up Survey Results

Since 1979, 25,818 middle school and high school students have successfully completed at least one summer component of TexPREP. Of these students, 81% have been members of

minority groups and 53% have been women. Of the 11,688 who are college age, 5,741 responded to the 2007 annual survey. The results of this survey are as follows:

- 99.9% are high school graduates.
- 99% are college students (2,875) or senior college graduates (2,789).
- 82% of the college attendees are college graduates.
- 74% of the senior college graduates are members of underrepresented minority groups.
- 47% of the senior college graduates are engineering, mathematics, science or computer science majors, **135% more than the national average, which is only 20%.**

93% of the college students (2,823), junior college graduates (44), and senior graduates (2,464) attended or graduated from Texas colleges.

HOUSTON PREP TEACHER TAKES PREP TO NIGERIA

Dr. Charles Glass, engineering faculty member at Houston PREP, is also a member of the school board in Nigeria. The Emmy Norberton International School (ENIS) was established in 1997 with the aim of providing sound and qualitative education for international standard in the rapidly developing city of Port Harcourt. Under the direction of the founding director, Dr. Chuma Onyekuru, Dr. Glass worked with ENIS students the summer of 2007 giving them a glimpse of Houston PREP activities.



Houston PREP Teacher, Dr. Charles Glass with Middle School Children in the City of Port Harcourt, Nigeria

AWARDS

Houston PREP is a part of a state-wide TexPREP program denominated **TexPREP**, which has received numerous state and national awards and citations as a model program. They include:

- Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (San Antonio PREP, 1997)
- Citation, 1999 U.S. Department of Education White House Initiative on Educational Excellence for Hispanic Americans publication What Works for Latino Youth (1999)
- Quality Education for Minorities Network, Exemplary MSE Education Partnership Award (2001)
- Texas Higher Education Star Award (2002)
- Citation, What It Takes: PreK-12 Design Principles to Broaden Participation in Science, Technology, Engineering and Mathematics for the Building Engineering and Science Talent (BEST) Project, a Congressional blue ribbon panel on best practices on PreK-12 education (2004)
- American Society of Mechanical Engineers (ASME), recognition as one of the Premier Pre-College Programs helping teachers and engineers to strengthen the STEM skills of young people (San Antonio PREP, 2005)
- Best Practices in K-12 Science education Compendium, Bayer Corporation (2006)

Pre-College Program Houston PREP received a donation from Nielsen Company

The Nielsen Company, the world's leading provider of marketing information and audience measurement, awarded \$7,500 to UHD's **Houston PREP** program. The funds will be used to purchase equipment and add an instructor to the summer program. Ms. Sangeeta Gad, PREP Coordinator, Dr. Michele Sabino, University Advancement Director, Rosemary Portillo, Nielsen Company Corporate Communication and Public Affairs Representative, Dr. Richard A. Alo, Houston PREP Director, pictured below:



Ms. Sangeeta Gad, PREP Coordinator, Dr. Michele Sabino, University Advancement Director, Rosemary Portillo, Nielsen Representative, Dr. Richard A. Alo, CCSDS and Prep Director.

Houston PREP IMPACTS

"I just graduated from the University of Texas at Austin with a degree in Electrical Engineering. Houston PREP is such a great program. It provided those fun and creative elements we usually missed from our high school, and we visited with different companies which taught us about the current technology and kept us motivated. I believe PREP had a huge influence on my career choice because the program helped me find my true passions."

Houston PREP Alumnus, 2002

Houston PREP sponsors two special events each year, Engineering Day and NASA Day. Local Professional, industry representatives, and faculty members present to Houston PREP students. Robotics and Engineering projects are demonstrated by fourth year students on Engineering Day and NASA Day.



First year PREP students testing the rockets they built for NASA Day



Third year PREP students testing their bridges in PREP Engineering Day



Mrs. Sangeeta Gad having a welcoming session with PREP students

ELIGIBILITY REQUIREMENTS

Year 1 requirements include:

- Parental permission
- Recommendations from mathematics teachers and a counselor, science or English teacher
- Satisfactory conduct grades and an essay
- Students in grades 6 and 7 require a 90 average in current mathematics class and 90 or better average in science or English*
- Students in grades 8, 9, and 10 require an 85 average in current mathematics class, plus an 85 or better average in science or English*

Year 2, 3, and 4 requirements:

Students who successfully complete Year 1, 2, or 3 are invited to apply for the following year of Houston PREP, provided they meet other eligibility requirements.



Fourth Year PREP Students presenting their Robotics during Closing Ceremony