

PRE-K TO 16: AIMING FOR EXCELLENCE IN COMMUNITY OUTREACH AND ENGINEERING EDUCATION

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Abstract

The Center for Diversity in Engineering within the College of Engineering conducts outreach programs both during the school year and the summer months to prepare young students, parents and teachers for enhancement of the educational quality with emphasis on science, technology, engineering, and mathematics. The Center plays a significant role to recruit, retain, and graduate ethnically diverse student body that plays a significant role in increasing the representation of traditionally underrepresented ethnic and gender groups in the field of engineering. The outreach programs conducted by the Center enrich and strengthen the ties of the community with the College of Engineering and the university as a whole. This paper provides a glimpse at some of the programs and highlights of the Center's outreach efforts.

Keywords

Outreach, Recruitment, Retention, Diversity, Precollege programs

1. Introduction

Florida International University (FIU) is a minority institution with the highest minority student enrollment in the State of Florida. Florida International University ranks (NACME-GEM Data Book, 2003):

- 4th among the top producers of Latino engineers with BS degrees in the nation; and
- 23rd among the top producers of African American engineers with BS degrees in the nation.

The College of Engineering at Florida International University has a dynamic community with a multicultural environment. The pre-K to 16 programs is significant part of the educational programs for capacity building and advancement of the community. The Center for Diversity in Engineering supports the FIU's mission by engaging the students, teachers, families and communities in science, mathematics, engineering and technology education.

2. Program Focus Areas of Center for Diversity in Engineering

The Center for Diversity in Engineering is actively involved in outreach programs to recruit, retain, graduate and serve an ethnically diverse population to increase the flow of traditionally underrepresented ethnic, gender groups and students with disabilities into the engineering pipeline. The Center plays a major role by enhancing the existing precollege programs to address the needs of the local community to ensure that the educational programs are functioning as effective pipelines for education and training of the students.

The Center's programs focus on:

1. **Student diversity and quality:** Active recruitment and retention of students from underrepresented groups.
2. **Quality of education:** Enhancement of the capacity for teaching by providing access to comprehensive educational resources and research environment, parental education, and teacher training.
3. **Recruitment and retention:** Development of programs and procedures to maintain a steady fraction of students from traditionally underrepresented groups in the engineering program.
4. **Service to the community:** Programs for elementary, middle, and high school level students, parents, and teachers to prepare the students for the higher-level education.

Educational support and services offered through the Center's activities include:

- Emphasis on science, technology, engineering, and mathematics (STEM) skills for a diverse student population,
- Outreach and parental educational materials,
- Financial aid and student internships,
- Mentoring,

- Curriculum development and support,
- Teacher training,
- Vertical teaming relationships among educators at all levels,
- Integration of technology into classrooms,
- Dissemination of effective science and engineering education practices to schools.

Currently the Center has several on-going programs targeting Elementary, Middle, and High School level students. These programs are offered throughout the school year and during the summer. GEAR UP! (Gaining Early Awareness and Readiness for Undergraduate Programs), ENLACE MIAMI (Engaging Latino Communities for Education), FLAME (Florida Action for Minorities in Engineering), Proyecto Access/Miami PREP (Prefreshman Engineering Program), and Tele-MAESTRO (Mathematics, Arts, Engineering, Science, and Technology Reach Out) are all efforts to encourage higher education in our community and provide opportunities to students in Miami Dade County Public Schools, from elementary to high school level. The Center also provides job and scholarship opportunities for FIU students. FGLSAMP (Florida-Georgia Louis Stokes' Alliance for Minority Participation) and SHPE Honores (Society for Hispanic Professional Engineers) provide many students with financial assistance. FGLSAMP and SHPE Honores scholarship recipients are assisted in acquiring internships. Many are offered Summer Research Internships at NASA Centers around the country.

As the largest engineering college in South Florida, FIU serves as the gateway to Latin American and Caribbean countries. Educational outreach programs from pre-K to 16 play a significant role by:

1. Providing opportunities for education, training, and skills for the students from traditionally underrepresented backgrounds in advancement;
2. Enhancing the educational mechanisms to address the needs of the community to ensure that the educational programs are functioning as effective pipelines for providing advanced training the students to address the communities needs; and
3. Promoting interactions between students from traditionally underrepresented backgrounds, faculty and local organizations in the disciplines related with engineering and engineering applications.

The educational outreach activities of the Center continues to play a major role in:

- Establishment of strong partnerships and alliances with other institutions and community colleges;

- Strengthening the collaborations with agencies in the areas of education and outreach;
- Expanding and continuation of the teacher training programs in science and mathematics;
- Creation of programs in science, mathematics and engineering geared towards serving students with disabilities;
- Expanding Engineering programs in Latin America and the Caribbean.

3. Conclusions

FIU has been more effective than any other university in Florida in recruitment and retention of minorities in engineering and is among the top minority graduating institutions in engineering in the nation. Engineering education is important for the economic viability of the area. The existing and projected development and growth of the area requires an advanced level education for continuation of the economic growth and harmony of the community. Meaningful exposure and interactions between students, parents, faculty and local organizations at all levels of the educational system are essential components for effective outreach programs.

4. References

Florida International University, Catalog, 2003-2004.

Florida International University web site: www.fiu.edu.

Florida International University, Center for Diversity in Engineering web site: <http://www.eng.fiu.edu/cde/index.htm>

Florida International University, College of Engineering, Draft Strategic Plan (2003-2013).

NACME-GEM Data Book, 2003, "Engineering Collaborations: Preparing Technical Talent for the Economic Upturn," Distributed at the NACME-GEM Meeting, May 28-30, Houston, TX.