

**2011 “My Daughter Is an Engineer” Program Report**  
 A Mother-Daughter Weekend of Engineering Exploration at CSULB

**1. Summary of IEEE CSS Outreach Project**

<b>IEEE CSS Funding:</b>	\$10,000
<b>Total Project Budget:</b>	\$15,900
<b>Partnering Organizations:</b>	California Space Grant Consortium Columbia Memorial Space Center at City of Downey Women-in-Engineering Outreach Program at College of Engineering
<b>Attendance Total:</b>	32 (14 students, 14 parents, and 4 teachers)
<b># of Student-based Workshops:</b>	3 (Robotics, Controls, Roadmap to Academic Success)

**2. Project Description**

Funded by IEEE CSS and supported by the California Space Grant Consortium, the “My Daughter Is an Engineer” program, developed by the Mechanical and Aerospace Engineering Department in collaboration with the College of Engineering, brought mothers/daughters and their elementary schools’ lead teachers to campus for a three-day summer residential program. This K-12 outreach program was designed to introduce robotics and controls to young girls via hands-on engineering based workshops and aim to inspire girls to consider future careers in STEM. Funding supported 14 elementary school girls and their mothers in the summer residential program. Below is the URL of the program:

<http://www.csulbwomenengr.org/my-daughter-is-an-engineer>

**3. Project Goal/Objective and How Achieved**

Recognizing the importance of the critical role that parental support plays in the development of young girls’ academic success, this project offers a unique live-and-learn program for engineering exploration for the mother and the daughter. The objectives of the program are to promote interest in science, engineering, and technology to young girls through workshops on robotics and controls technology in everyday applications, and to promote parents’ awareness and involvement in their child’s academic preparation toward a STEM career. To achieve the objectives, the program was designed as a three-day residential program conducted on the weekend of July 8<sup>th</sup> – July 10<sup>th</sup> at CSULB for 14 5<sup>th</sup>-grade girls and their mothers. A copy of the program agenda is on p. 3, and below are the details of the workshops and activities.

- Two engineering-based workshops on robotics and controls technology in everyday life.  
 Each student and her mother formed a team, made a remote controlled robot (called the RC Snap Rover), designed an application to use the robot in helping a daily task, and presented their project and demoed their robot. Three winners were selected based on the creativity and performance.
- A workshop on academic career preparation and skills learning.
- A field trip to Columbia Memorial Space Center at City of Downey.  
 Students and their mothers visited a realistic mock-up of a spacecraft and mission control room, became crew members on a simulated space mission to solve real-life problems in math, science and technology to successfully complete their mission. They also visited a robotics lab to program a robot on Lego/Mission Mars computer and tested their skills with collecting, surveying and rescuing.

**4. Evaluation of Program’s Success**

Participants completed a program survey, which includes the evaluation of the workshops, the field trip, and other activities on campus. The survey tool assesses students’ background knowledge of engineering (prior

to experiencing the event), such as having them define what engineering is, if they are interested in engineering, and what robotics and controls are. The post-event portion of the survey solicits students’ reaction to the program activities as well as asks them to comment on what they feel can be improved. The survey results are not yet available and will be tabulated during the fall semester when support staff may be available.

**5. Other Comments/Suggestions**

- A copy of the program artwork (which was printed on the event t-shirt, posters, and other publicity items) is included on p. 4.
- A copy of the program publicity is included on p. 5 – p. 7.

**Expenses for 2011 “My Daughter Is an Engineer” Program**

Budget Category	Items and Description	Cost
Student support	Support for two CSULB students as Residential Assistants, including 8% fringe benefit	\$1,698.72
Materials and supplies	Including workshop supplies (e.g., robotics and control technology kits, etc.), school supplies for student participants (e.g., notebooks, etc.), office supplies (e.g., paper, pens, CDs, etc.), and program t-shirts	\$3110.03
Food and beverage		\$272.50
Bus transportation		\$532.50
Room and board	Room and board including meals and parking for 22 people for two days in double-occupancy room at CSULB	\$3,476.25
Administrative overhead		\$909
Total spent		\$9,999

2011 “My Daughter Is an Engineer” Program Agenda

2011 My Daughter is an Engineer – AGENDA  
 College of Engineering, California State University Long Beach

	Friday July 8	Saturday July 9	Sunday July 10
6-8AM	Wake up call: Breakfast at 7-8AM		
8AM-12PM	<b>Check-in &amp; Pre-Program Survey</b> 8:30am-10:00am (ECS 202) (For ALL)	<b>Robotics &amp; Controls II</b> Drs. Lu & Marayong 8:30am-11:30am (ECS-202) (For students, parents, and teachers)	<b>Columbia Memorial Space Center</b> (For ALL) Bus to leave at 9am Space Shuttle Mission 10am-noon ('lunch to go')
	<b>Dorm Check-in &amp; Campus Tour</b> 10:00am-11:30am (Students & Parents)		
12-1PM	Lunch	Lunch	Lunch
1-2PM	<b>Robotics &amp; Controls I</b> Drs. Lu & Marayong 1:30pm-4:30pm (ECS-202) (For students, parents, and teachers)	<b>Roadmap to Academic Success</b> Lily Gossage (ECS-202) 1:30pm-2:30pm (Students & Parents)	<b>Aerospace Engineering Workshop</b> (ECS 210) 1:30pm-2:30pm (Teachers)
2-3PM		<b>Design Project Presentation</b> (ECS 202) 2:30pm-4:30pm (For ALL)	<b>Graduation</b> (Conference Center) 1pm-3pm (For ALL)
3-4PM			
4-5PM			
5-6PM	Dinner		
6-9 PM	Activities and Project Time		

The CSULB student chapter of the Society of Women Engineers (SWE) will host an ice-cream social on Saturday July 9th at 6:30PM

2011 “My Daughter Is an Engineer” Program Artwork



# My Daughter is an Engineer



Sponsored By:



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**California Space Grant**  
CONSORTIUM

In Collaboration With

**Women-in-Engineering  
Outreach Program**  
COLLEGE OF ENGINEERING

CALIFORNIA STATE UNIVERSITY, LONG BEACH

## Publicity of “My Daughter Is an Engineer” 2011 Program

### Everything Long Beach

#### **CSULB Receives Grant Funding ‘My Daughter Is An Engineer’ Program**

Will Encourage LBUSD Girls to Enter Engineering Careers

Statistics show that only about 20 percent of engineering students are women, and that women make up only about 10 percent of professional engineers. Three women in the College of Engineering (COE) at Cal State Long Beach (CSULB) are trying to change that.

Bei Lu and Panadda Marayong, both assistant professors from CSULB’s Department of Mechanical and Aerospace Engineering, and Lily Gossage, director of the College of Engineering Recruitment and Retention Center, have received an approximately \$16,000 grant from the IEEE Control Systems Society, including supplemental funding from the California Space Grant Consortium, to implement a unique program that encourages elementary school girls to explore an interest in engineering careers.

The “My Daughter is an Engineer” program will bring mothers and daughters and their elementary schools’ lead teachers to campus for a three-day residential program. Activities will include engineering-based workshops on robotics and control technology in everyday life, academic career preparation and skills learning, and engineering-relevant field trips.

The CSULB grant was one of just nine awarded among worldwide applicants.

“Research has shown us that we can help students help themselves with their academic success, but teaching parents to become fully engaged in their children’s educational pursuits is the greatest investment of effort that any outreach program can hope for,” Gossage pointed out. “Obviously, having parents who support their children’s education makes the greatest difference. Social stigmas discourage girls from considering engineering even though they’re often well prepared, but we can show them that engineering is quite a lucrative and awesome career for women.”

The “My Daughter” program is open to 20 fifth-grade girls, who will be selected on a competitive basis from six Long Beach Unified School District elementary schools that have been identified as having high-minority student enrollment and serving low-income families.

“The idea of reaching out to students at the earliest age possible, before they are subjected to peer pressure in the later years, is also supported by research,” she added. “Another factor is the way math is taught in many schools; we can help young girls overcome the negative mindset about math by showing them the practical uses of math.”

The program showcases engineering applications and the impact of engineering on daily life as well as provides information to support ongoing parental involvement.

While teachers will be co-engaged in the program activities along with the mothers and daughters, teachers will also have additional projects-based workshops that incorporate four NASA Directorates; teachers will be trained to weave NASA content into existing K-12 curriculum.

“We will have lead teachers from every participating school. They play a very critical role in their school’s curriculum, and they can bring back information to the entire school. They expand information beyond what occurs in the classroom,” Gossage said. “We can really use lead teachers as spokespersons for our programs and advocates for the girls.”

The “My Daughter” program is planned for a three-day weekend in July. To maximize the grant so that the girls and mothers receive the fullest support possible, all three women will volunteer their time to conduct the program.

Gossage said the title of the grant proposal was not technical and probably caught the eye of those making decisions about the awarding of the grants. She said this is the first time she has heard of a program that incorporates engineering outreach for mothers and daughters and at the same time blends common program components to serve the professional development of school teachers.

CSULB has a long-standing commitment to promoting underrepresented minority students and women in sciences and engineering. Another recent program, the “Engineering Girls @ the Beach” program, was an off-shoot of its highly successful “Women Engineers @ the Beach” program. The “My Daughter is an Engineer” is a first-ever program established specifically to serve a mother-daughter population.

“The program’s title conveys a powerful and self-fulfilling quality, and we will work hard to give the girls the best chance possible to succeed,” Gossage noted. “We are very excited about the long-term impact of this program and would like to see it evolve in other districts and into other disciplines such as physics and areas where women continue to be underrepresented.”

## Daily 49er

### **CSULB engineering program for girls gets grant**

Cal State Long Beach was awarded one of nine grants worldwide for an engineering outreach program geared toward fifth-grade girls and their mothers.

The "My Daughter is an Engineer" program was designed to promote technology outreach and engineering career awareness amongst Long Beach Unified School District fifth-grade girls.

Bei Lu and Panadda Marayong, assistant professors from the department of mechanical and aerospace engineering, and Lily Gossage, director of the college of engineering recruitment and retention center, collaborated for the \$16,000 grant from IEEE Control Systems Society and additional funding from the California Space Grant Consortium.

The three-day program will take place in July. Girls and their mothers will stay in CSULB dorms, go on a field trip and participate in activities, including hands-on robotics workshops, control technology and academic success.

Teachers from chosen schools will also participate in workshops and be trained in four NASA Directorates as part of the consortium grant.

All participants are chosen on a competitive basis, which requires students to demonstrate "academic success in standardized math and science scores," Gossage said.

The LBUSD schools are selected based on low-income and high-minority student enrollment because "women and certain ethnic minorities are still underrepresented in the engineering and technology field," Marayong said via email.

According to Gossage, less than 10 percent of professional engineers are women because the occupation is often associated with social stigma for women.

"As research has shown that girls lose interest in [science, technology, engineering and mathematics] by the time they reach eighth grade, we target elementary school students in an attempt to capture their interest in [these areas] as early as possible," Marayong said.

Gossage said many students shy away from engineering as a career choice because of a "lack of awareness of the engineering discipline" and the failure to fully apply math and science within the profession.

While an appreciation of the sciences is important to engineering, so is strong parental involvement.

"The uniqueness of our program is to invite both girls and their moms because we believe that moms play an important role in guiding her daughter's career path," Lu said via email.

The department has hosted a number of other outreach events to raise awareness of women's opportunities in technological and engineering careers through "Engineering Girls @ the Beach" and "Women Engineers @ the Beach."

Gossage said that any donations to the program can be made to the CSULB Foundation, addressed with "Women and Engineering Program" in the memo.