

Recruiting Women of Color to STEM



Host: Donna Milgram, Executive Director, Institute for Women in Trades, Technology & Science

Presenter: Lily Gossage, Director, Maximizing Engineering Potential (MEP) Center for Gender, Diversity & Student Excellence, California State Polytechnic University, Pomona College of Engineering

Interview Transcript:

Donna: Hello and welcome. My name is Donna Milgram, Executive Director of the Institute for Women in Trades, Technology and Science. I'm so excited to welcome you to this session of the *STEM Success for Women Telesummit*, funded by the National Science Foundation.

We have an interview with a very special guest. At the end of the session, you'll have an opportunity to ask our guest, Lily Gossage, questions.

Our guest today is Lily Gossage, the director of Maximizing Engineering Potential at California State Polytechnic University, Pomona. She provides oversight on programs and activities with recruitment, retention, and success of women, underrepresented minority students, and students from other underserved communities in the College of Engineering.

Previous to her current position, she was the director of the Engineering Honors Program and research associate for the Office of Engineering Educational Research and Assessment at California State University Long Beach. Her responsibilities involved studying and evaluating academic trends and practices that hinder student success, timely graduation, and developing college and institutional-level proposals to enhance engineering student success.

As founder of the Women Engineers at the Beach and Engineering Girls at the Beach, she finds women and engineering advocacy the most gratifying aspects of her efforts. In 2011, she developed the My Daughter is an Engineer Program, a summer residential program for 5th grade girls and their parents. And in 2013, she developed Engineering Girls: It Takes a Village, a summer residential program that serves girls and mothers who reside at a local homeless shelter.

Lily also serves as the chair of the board of directors for the Pacific Southwest Section of the American Society for Engineering Education. Welcome, Lily, and thank you so much for joining me for the STEM Success for Women Telesummit.

Lily: Thank you so much, Donna. It's a pleasure to be here. Donna, you and I, many years we've known each other since WEPAN, so I think we actually met each other at another engineering educational organizational, the Women in Engineering Proactive Network. So glad to be connecting back with you.

Donna: Well, I'm so glad to be connecting back with you as well. And I remember part of what you and I really connected around was our love of data. We're both data-heads.

Lily: I think we've spoken till 12 midnight and I think it's important for the listeners to understand some of the strategies here. Over time, people needed to be convinced, and so assessment is a very big part of what I do. I think we'll have an interesting conversation, and thank you for having me on today.

Donna: It's my pleasure. So you're not going to be surprised that my first question to you is about data. Now, I understand that in engineering, Cal Poly Pomona has 5,200 students, which is the largest engineering program in the state of California. It's huge.

Lily: Yes, yes, we do.

Donna: Can you tell me what is the gender and ethnic breakdown of the student body?

Lily: Before I do that, I think some of our listeners may not be familiar with Cal Poly Pomona, so I just wanted to spend maybe just a minute or so explaining what a Polytechnic is.

Cal Poly Pomona is a Polytechnic university, meaning that it enrolls a lot more STEM majors. So the majority of our students are STEM majors. And in California, Cal Poly Pomona is one of two Polytechnic universities within the system of 23 California state universities, or CSU.

Our sister campus is Cal Poly San Luis Obispo. So we are the other Cal Poly. We are Cal Poly Pomona. Nationally, I believe we have seven Polytechnics. I think Rensselaer Polytechnic Institute in New York. And so really when you're talking about STEM programs, STEM education, Polytechnic universities are in a very special position.

Right now, we're currently enrolling. You're talking about data. We have, institution-wide, over 20,000 students. Now, within the 23 CSUs, we do have a lot more males, not too much. About 56% of our students overall are male; 43% female – so about 12,000 and 9,000.

We are very happy that close to 90% – I believe it's like 88% – of our students are enrolled full time. So within that figure that I told you of over 20,000, 5,200 students are engineering students. So it is a very large engineering program.

So I think we thought what a wonderful position and opportunity here to increase the diversity and try out new strategies for our students of color.

Donna: So it's actually about 25% of your student body are engineering students. What percentage is female and can you give me the ethnic breakdown of the engineering students?

Lily: Yes. Now, this is very interesting. So I don't think over the years, since Cal Poly Pomona is an HSI. For our listeners, that's a Hispanic-serving institution. Right now, over 37% of our students are Hispanic. Almost 25% are Asian; even 20% Caucasian; 3.2% African-American; 4.3% Native Hawaiian, Pacific-Islander; and less than 1% – I think it's about .4 or .3% American Indian Alaskan-Native.

If you look at all students who identify as non-white, it's about 70%. So 70% of all Cal Poly Pomona students identify as non-White.

Donna: That's very high. How many are in an underrepresented minority?

Lily: 45%.

Donna: 45%.

Lily: Yes.

Donna: So that actually is much higher than the national average. I'm really looking forward to talking about how Cal Poly Pomona gets those numbers. Now, what about women? What is their percentage of that student body? And women in color, in particular?

Lily: Sure. I want to step back just a bit. That figure that you mentioned before, Donna, the 5,200, we're still a little above that. That 5,200 figure represents our engineering students. So if you look at the total, which I had said is about 20,000, engineering students represent 56% of all STEM majors. And given this tremendous student diversity coupled with a high engineering enrollment, Cal Poly Pomona is actually in a very special position with regard to increasing diversity across the nation, not just state.

And another fun fact is that we have the largest undergrad civil engineering program in the United States. We produce about 15% of the civil engineers. In fact, our last figure showed that 1 out of 14 engineers in California comes from Cal Poly Pomona and there's potential here for us to serve as one of the primary sources of workforce talent in California.

When you're looking at women overall, – this is National Science Foundation data as of 2013 – no more than a mere 5% of the STEM workforce is represented by women. At Cal Poly Pomona, 32% of the students enrolled are women. When you're looking back at the freshman admission, I want to go in to the strategy. I hope you ask me a question about how we got there.

Donna: I will, I will. I just want to point out for our listeners that nationally, it's 18% of the degrees awarded at the Bachelor level go to females. So you're doing a little bit more than the national average with your freshmen, and even better overall. What about women of color that are underrepresented? What percentage are they of your female population?

Lily: A little over half.

Donna: A little over half, great. So that holds your 45% overall and a little over half. That's great. So we definitely want to hear your strategies because this is not the norm. This is much higher than the national rate. So that is great.

What I'd like to do is ask you to share your highest impact strategies for recruiting because I know that others will want to replicate the kind of diversity that you have at Cal Poly Pomona.

Lily: Okay, Donna, I do want to say first that I've been at Cal Poly Pomona just over a year. So a lot of these strategies are not my own strategies. I want to make that perfectly clear. These are longstanding strategies that Cal Poly Pomona has facilitated for over 30 years. I am just building upon what has worked in the past and just enriching it.

What I will tell you is in 2011 – this is fairly recent – even given this excessive, we've gotten a little better in the mechanisms – the College of Engineering created what is called CPP – for Cal Poly Pomona – WE – which is Women in Engineering.

Associate Dean Dr. Cordelia Ontiveros initiated that program in 2011. We're looking back at trend data just to see what kind of interpretation we can make about what we did. A lot of times as a woman in engineering, minority engineering advocates, we do things and we don't look at the mechanisms: what it is, if there is a correlation between our results and what we actually did.

So we looked back in 2007. From 2007 to at 2011 – that's the year we started the Cal Poly Pomona Women Engineering program – the admission of female students wavered from 16% down to about 15% in 2008 and '09, and went back up to 17% in 2011.

In 2012, the year after the program was initiated, we had a 21% admission rate of females. In 2013, it went up to close to 23%. We had to explain where this 7% shift came from. So you look back in 2011, there was a rigorous, robust effort for recruiting women. And then now we're getting into your question about what we actually did.

Donna: Yes.

Lily: So at Cal Poly Pomona, we have what's called an Engineering Scholar's Day. We don't call it a Minority Scholar's Day. It's an event held in early March, well before the intent to enroll deadline, which is generally May 1st.

We invite all the women students, all the underrepresented minority students, to spend a day at Cal Poly Pomona. So it's an eight-hour day. They get here around 7:30. We have lab tours and we have student leaders from the various affinity groups, such as AISES, NSBE, SWE, SHPE and, of course, our Women Engineering Ambassadors.

Donna: I want to ask you two questions. Then you can tell us more about the day. One is these students, are these prospective students?

Lily: These are admitted.

Donna: Admitted.

Lily: Yes, these have received admission notice. And at the time that we're inviting, they are still provisional admit. They have not yet made a decision, so really this Engineering Scholar's Day is our yield event. There is no guarantee that they're going to enroll at Cal Poly Pomona.

So we receive a list. We download a list of students who are admitted to Cal Poly Pomona for the following fall and we invite them – it's like a pumped up version of an open house.

Donna: So it's high school students, actually. These are high school students.

Lily: Yes.

Donna: And then could you spell out some of those acronyms, because I know that some of our listeners may not be familiar with these engineering associations that you had mentioned.

Lily: Yes, we have several cultural affinity student organizations, and they are a student chapter branch for the national professional organization. The first one is AISES is American Indian Science and Engineering Society; NSBE is National Society for Black Engineers; SHPE is Society of Hispanic Professional Engineers; and SWE is Society of Women Engineers.

Of course, our newest one that I want to mention is Habitat for Humanity, for because it's got a poverty alleviation focus in that group. But these are all of the groups that we work with, the student groups that we engage in all of our various outreach recruitment and also retention strategies.

Donna: Okay, and so on the Scholar's Day, you've got the high school students that have been admitted but may not necessarily be going to in the direction of engineering. What do you do with them on that day? Do you do anything else while we're talking about high school with high school students?

Lily: Yes. After the invitations are sent out – and I think this is an important point to make – we don't just send an email for our women of color – it's all women. They receive a hard-copy letter. So it's important for us to personalize it. So all of the emails and the hard-copy letters are personalized.

A week after that, our MEP – and I'm hoping that you'll ask me about that later – Maximizing Engineering Potential program and our women engineering program staff collaborate to do a phone campaign. We send out the invitations and there is a personalized phone call to each student who is invited.

The event is open to students and their parents. They come to the campus to learn more about both MEP and our Cal Poly Pomona Women Engineering program. All of our cultural affinity groups are involved in the development of the program. The special part of the Engineering's Scholar's Day is the lunch hour.

We host a separate woman's reception and a separate MEP lunch-and-learn session. Students can go to both and oftentimes, they'll have the parent at one and another parent at another. But it's a day where they can get a lot of detailed information, not just about Cal Poly Pomona engineering curriculum. They do visit the labs that day and meet with the faculty. Some of the chair people are there.

They also get to have time, special time, to talk with the staff who are running both programs. So there's a lot of information that is provided to them so that they can make an informed decision, whether they'd like to choose Cal Poly Pomona to pursue their degree.

After the Engineering Scholar's Day, the students receive a survey. So we also want to find out, my goodness, of the students that have gone to our program, or day, how many might be interested. We want to make sure we project enough seats for MEP.

A couple weeks later, all of the students who attended the Engineering Scholar's Day and also the students who weren't able to – students of color and women all receive an MEP application via email. A week after that, our staff call them again. This is a second phone campaign that is initiated after the application cycle has begun. It's very important, critical, for students of color, first-generation, low-income students, and women students – again, these are all the underrepresented groups in engineering – to receive a personalized phone call.

This is what we do at Cal Poly Pomona to make sure they feel welcomed. We're finding a lot of positive results because of this personalized touch.

Donna: And so I am wondering how is it that you get the list specifically of women and students of color? Does the research office give it to you so that you can then pursue them, or Admissions? These are students that have been admitted, or a prospective, they made an offer? How do you get the list?

Lily: Donna, every institution is different. I remember when I was Cal State Long Beach – I was there for a little over 15 years – we had to request a list and FTP it over from Enrollment Services. In Cal Poly Pomona, there's a very strong push for access to data. So I myself am able to download that detailed, micro data on my own computer of the students that are admitted. The data is disaggregated by gender and by ethnicity. It has the major and all of the contact information.

I understand it may not be a very simple request for other institutions, but at Pomona, we are able to do that. The administrators are able to do that on their own so it does make it easy. But I understand in other institutions, it may take a request.

Donna: Sure. These are students that already have decided to come here. Are you also doing outreach to the high schools to get them to apply in the first place?

Lily: Cal Poly Pomona had a very long track record of attracting the best and brightest. We'll talk about the SATs later. It's important for us to continue to do the outreach. And when I say outreach, I'm specifically talking about K-12, not necessarily looking or identifying talent in the high school, college-ready students.

So reach all the way back to elementary 4th grade. We have a very strong vigorous K-12 outreach through the College of Engineering Dean's office, through the Maximizing Engineering Potential program, the Center for Gender Diversity and Student Excellence, and all of our cultural affinity groups are involved in K-12 outreach.

Donna: May I interrupt you for a minute?

Lily: Certainly.

Donna: I think it's important – and I was really talking at this point about recruitment, per se, but you have made a distinction. I think it's important for our listeners to understand, which is you're talking about outreach and that's different than recruitment. Could you explain that a little bit?

Lily: Yes. We are attracting the best and brightest. And you're looking at our average SAT scores – 550 SAT is really deemed student college math already. But we have students who fall below that. Our average is around 530. So the SAT math, the range that we're looking at, students we serve, is 490 to 620. That's low.

But we still admit them. There are remediation programs for students and so we really strive to prepare students who come in a bit underprepared, and we can't do that through recruitment. We have to go way back and we have to reach out to the elementary. It's a math developmental process. So we have to get involved in the outreach aspect, which means K-12.

Recruitment is serving high school and community college students because at that time, they are ready to prepare for their SAT math and English preparation and take those particular admission tests.

Outreach is an important aspect of Cal Poly Pomona STEM success strategy. And as I mentioned earlier, it's a college-wide initiative. We cannot wait to just serve the students who come to our doorsteps. We also, as faculty and staff, have to reach out and help the K-12 teachers.

In fact, I was a teacher many years ago. I used to be a teacher at the K-12 level. I taught middle school and high school. And I didn't have all the necessary resources or knowledge base to help prepare students for an engineering career.

This is really not a local issue. It's really a national issue and I believe there was a wonderful report that the National Academy's put out. I think it was 2007 or '08 titled *Rising Above the Gathering Storm*. The problem of K-12 outreach and preparing our country for qualified STEM professionals is articulated in that particular report.

So a lot of the public universities offering STEM programs are now really under a lot of pressure to adopt new outreach strategies.

Donna: I'm so glad. I want us to go the community colleges and how you recruit from there in a moment because I know you told me that's actually where the majority of your students are coming from.

But I'm so glad you made the distinction because outreach is important. I find so often colleges will do outreach and expect enrollment, when they're not actually doing recruitment. I appreciate that you do both at Cal Poly Pomona and I know that you're committed to both, Lily.

You understand that you have to do the actual recruitment in addition to the longer-term preparation strategies which is outreach. It's such an important distinction, so I just wanted to really underscore that.

Can you talk now about your strategies with the community colleges and about the percent of the students of color coming from the community colleges? I know that's a big pipeline for Cal Poly Pomona.

Lily: Yeah, just wanted to make a correction. Most of our students are actually freshmen. We have a lot of opportunity to increase the number of community college students because many veteran students – and these are military folks who come in and now they're transitioning to civilian life – go through the community college outreach.

I know there's a lot of data out there to show that a lot of the traditionally underrepresented students start out at the community college. So with that, I'm stating that the community college is really a source of untapped population of diverse students that a lot of universities are working toward.

At Cal Poly Pomona, I'm also the advisor for SWE, the Society for Women Engineers. We have a technical advisor as well. SWE at Cal Poly Pomona offers a program – actually, it's an event – called ACCESS Advancing Community Colleges by Empowering STEM Students. I really applaud the SWE chapter for their foresight into supporting community college students. How that particular event was created is that many of the SWE leaders are community college transfer students, and they're women, particularly women of color. They noticed that there was a lot of outreach that was based on K-12, but nobody was

paying attention to the community college students, where the majority of the students of color come from who will go into the STEM fields.

Donna: I've actually seen numbers that show half of the students of color are going to the community college first and then transferring.

Lily: That's accurate.

Donna: That is so important because I find that community colleges can be overlooked by four-year colleges as a source of students of color and female students as well. So that's a really important piece of information.

Can you tell me a little bit about how Cal Poly Pomona reaches out to the two-year colleges in the area to serve as a pipeline?

Lily: There are many numerous programs, but we recently started with Cal Poly Pomona Transfer. That's fairly new. That's a campus-wide initiative. It is not housed within the College of Engineering. But that came after considerable conversation prior to my coming to Cal Poly Pomona.

But the Poly Transfer program at Cal Poly Pomona was designed to ensure a transfer-receptive culture. They have a summer bridge program as well. It's a very unique program, fairly new. There's not much data on it, but I can tell you that I was glad to hear that that was coming because it's programmed specifically for new transfer students.

I think we often forget that adult students also need to be supported in their transition. The community college is a much smaller campus and the culture of the community college is different from the culture of the four-year. Through this Poly Transfer – again, fairly new – students receive information, referral, support services, and they're taught how to navigate Cal Poly Pomona. Remember, every institution is different.

They provide personalized problem-solving and guidance. They have their own professional staff. They offer quarterly workshops based on the student's major. Again, it's fairly new but there's quite a bit of information that our listeners can look at on the website. I believe Poly Transfer started a Poly Transfer Academy as well, where they offer quarterly mixers for student groups to sort of help them establish creating an ongoing community where they meet other transfer students. And transfer students are commuters.

Lily: So it's important that there's a support service for them. Yes, Donna.

Donna: Tomorrow, Dr. Mary Anderson-Rowland is actually going to be presenting in the morning. I will be talking with her. She actually has created a very successful transfer program at Arizona State University that is specifically for community college students. She has written a lot about this issue and the importance of providing those supports.

I know that many of those in her transfer program are first-generation going to college in their family. Is that also true at Cal Poly Pomona as well?

Lily: Yes.

Donna: What percentage of students in your Maximizing Engineering Potential are first-generation?

Lily: Well, all of our students are first-generation. MEP serves first-generation, low-income, underrepresented minorities. What is different about the new administration for MEP is we now serve all women, with a focus on women with color. But we pride ourselves on supporting the students who are the least resourced.

Donna: Okay. And do you only serve students who are least resourced? Or do you serve all students of color, for example?

Lily: We cast our net wide in the past, and I think the listeners will agree – all of this takes funding. I think it's unfortunate that sometimes we want to help all students who need help, but we're restricted by resources and funding. We've had an increase of funding in this latest administration, so we were able to cast our net wider.

In the past 20 years or so, the MEP program would admit anywhere from 80 to 90 students, serving about 60, serving about 30 in their MEP summer bridge program. We now admit 200, even though our need might be almost 500. So we get anywhere from 300 to 500 applications.

So we're serving half of the students who are under-resourced; students who are students of color who may not be specifically served through the program can still access our services. I want to go into some detail about that later, but our focus is on first-generation underrepresented students and women. We have enough resources to serve a wider gamut of students.

Donna: Okay, and so that brings me to another topic, which you've mentioned a couple times, but I'd like to talk about it explicitly, which is the summer bridge program and really helping to set students who may have less background, maybe have less offered in their schools, up for success. Could you talk a little bit about what that looks like at Cal Poly Pomona?

Lily: Yes, the summer bridge program at Cal Poly Pomona – since we have a very large pool of students coming in, we have to split it – is a three-day residential program. We pay for all of the expenses of the students. They stay in the dorm rooms. There's an academic component, where they are provided with tutoring – math, physics, at the level that they enter. With some of our students that who are a little bit more prepared, they can skip forward.

We also provide soft-skills workshops. We provide students with a guideline on how to write a professional email. Really, the highlight of the summer bridge program is getting the students connected to industries so we have a lot of support from the engineering industry. Our recruiters are the individuals at the companies that look at résumés and interview student candidates.

They come from Northrop Grumman, Boeing, Lockheed Martin, Union Pacific, Southern California Edison, just to name a few. They are involved in our summer bridge program. So it is an intense three-day program. Students are put into learning groups based on their incoming SAT math. That summer bridge program doesn't just end there, and I hope you'll ask me a little bit more later what we do with them in the first year.

But it is important for students who are first-generation, low-income to have a way to help them navigate before the semester begins. When the semester – we're on quarter system – I forgot at Cal Poly, but I think we're transitioning to semesters soon.

During the beginning of the fall term, students are trying to find their ways to classes. There's very little opportunity for them to lean on a peer. So we put them in peer groups during the summer bridge program and we have specific classes also for our MEP students that keep that community together.

It's a challenge though, and so most recently, we're relying more on social media to reach our students. But the summer bridge program is an important programming aspect for MEP and the results are astounding, when you take a look at how many of these students continue to find each other the next four, six years that they're at our university.

Donna: So does the summer bridge program, in addition to connecting the students with the industry and connecting them with each other so that they have community together, which I know that the literature shows is very important for both female students and students of color, does it also include hard skills, like math? I know math is a big area, both for women and also for students of color. Often, bridge programs provide sort of a boost in math because often these students have less background and that this helps them. Is that one of the areas?

Lily: Yes. It's not just what we call it is social professionalization. We go beyond that for our engineering summer bridge program. In fact, it's called Engineering in Your Future. We see them as engineers. We talk about their day of graduation during the summer bridge. We are able to help them visualize what they will look like in four years, five years, six years.

It is very math-intensive. So they have tutoring every day of the summer bridge. In fact, during their first year, our freshmen are required to go to tutoring. So we hire tutors, several tutors. Tutor is offered – math, physics, chemistry, and of course, some of our low-completion rate engineering – 200, 300-level courses, five days a week, eight hours a day. From 8:00 to 5:00, there's tutoring.

That is actually a requirement of participation in MEP. Now, this is really important because when I was looking at data, there's a big difference in the major GPA between first-generation and non-first-generation students. I looked back at five years worth of data and the difference between first and on-first is actually about .05.

Now, when you look at this difference, the contrast is greater when first-generation status is compared to underrepresented minority status. It's about a .2 difference. Then you look at that sort of data and you compare it against financial needs, that difference is actually more striking between non-first-generation, first-generation – almost .3.

So as we're trying to help students, we have to look at the different combinations of data. So a student who is first-generation, low-income is doing well, but not comparatively doing well when you compare with non-first-generation of high-income. You can look at all types of combinations, but when you have that low-income status, low economic status in there, you see a big difference.

I think back to your questions about looking at students who are underrepresented but may do very well in math. Well, if they're underrepresented – traditionally underrepresented, meaning African-American,

Native American, and Latino or Hispanic – they still are not doing as well as their non-underrepresented minority counterparts. The data is very evident about that.

Donna: That's true. Often, they didn't have the opportunity to have courses at the secondary school level that would have provided them with the skills. It sounds like if you want to belong to MEP, when you apply for membership, you have to agree not only to the summer bridge, but also to tutoring in these areas the students have had more difficulty with. Is that right? And does it go beyond the first year?

Lily: Yes, it does. And I also was remiss in mentioning prior to the summer bridge, students who are admitted to MEP are required to go to what we call the Fall Scheduling Workshop. All admitted students attend the summer – most institutions have it, like a summer orientation, where they actually register for the classes, right? Well, in MEP we have an event that occurs prior to the orientation and then registration. It's called the Fall Scheduling Workshop.

It's sort of a practice run. All of our admitted MEP students come to Cal Poly Pomona. This would be in mid-June and our MEP staff show them how to register for courses. We leave an hour between courses. Again, these are first-generation students. They are also provided with MEP-specific introductory engineering courses. So we have set aside sections and we provide permit numbers for MEP students to enroll.

And they enroll with the peers so they are blocked together. They may enroll in their math with their peers together, the engineering introductory course together, their physics courses, and even their liberal arts, the general education courses together. This is the best way we can see to keep the community together. Community exists in the classroom and also outside the classroom.

Donna: I'm also thinking from the perspective of students who are similarly situated. Yesterday, I was talking to Dr. Charlie McDowell about pair programming and he was part of a group that successful included pair programming in a big intro – and he still does – to computer science and it greatly increased retention of female students and also of male students, and also a higher percentage selected computer science as a major.

I asked him if they'd also looked at this in terms of underrepresented minorities and he hadn't personally, but he talked in a pairing process it's important to have students of similar levels, and the men to have, overall as a group, less background and then more comfortable pairing and working together. You don't have someone who's taking over.

I would imagine that having these students together, also there's that same kind of dynamic, where perhaps they then feel more comfortable. Maybe they don't have as much background on the lab. Maybe their high school – or if they're coming straight from high school – didn't have engineering offered at the high school level.

So I would see the advantage, not only from a community standpoint, but also from a confidence standpoint, because they're with students who are similarly situated. Am I right in my assumption there? Is that part of the dynamic?

Lily: Yes, I don't know how you knew we did that. During the summer bridge, we actually break them up by their math level. So they're studying with similar peers who are at the same level. I forgot that mention that, and I go back to your question about retention for MEP, if I will.

I think you had asked the question what happens after summer bridge. Do you want to go there now or wait till later?

Donna: You can go there now, yeah.

Lily: Okay. In the first year, either the first week or the second week, we have a very large event and we have what are called milestone MEP events. In the first fall quarter for MEP students, we have a fall welcome kickoff and mentor match where our junior and senior level MEP students participate in a four-to five-hour event. We have live music and food as well. And all of the various engineering folks are there. The incoming freshmen sign up to receive a mentor.

So we match them up with a mentor. We provide a peer-mentor lunch through MEP. In the winter quarter, we have a winter MEP winter challenge. Again, the same cohort of students is invited to meet and there's an academic challenge during the winter.

In the spring, we have an event called Engineering Rocks, where the students – again, these are the fall MEP cohort students – come together and showcase everyday examples of engineering in a very cool way. And again, all of these are very fun and festive ways to help students.

So all four quarters – summer, there's the summer bridge; fall, there's the fall welcome and kickoff and mentor match; there's the MEP winter challenge; and there's the spring Engineering Rocks. It's important that we invest time and effort into bringing the students back together.

When they see each other, there is now another opportunity for them to form their own groups. After the first year, we do serve students through social media. We have a new engineering high-tech learning center where we will have workshops both in person and through a webinar. So we're able to reach students even when they're not on campus.

We're finding with this new generation of students, Donna, they're not always wanting to see us in person, and I think that's perfectly fine. They still can be engaged. Even here, your Telesummit is a wonderful, brilliant idea. It's reaching all these students. So there's no excuse for them not to be engaged with us.

Donna: Facebook, Facebook. That's the way to reach them. The other thing that I want to mention though is after the freshman year then they can go into the different minority in women's organizations that you have on campus. You're fortunate. You've got five minority engineering associations and SWE.

By the way, I do want to mention how wonderful it is that SWE is serving also community college students at your campus. We do a lot of work with community colleges around the country and I really wish that was true throughout their network. I think it's great that you're a leader in that regard because I wish that SWE could be a resource for all the community colleges. Women need that same kind of support.

So the students have the option of connecting with these programs, which is great. Of course, they have the original mentor that you paired them with as well. There are a lot of opportunities to connect with others.

Now, one thing that you didn't mention, but I know you've done some work with, is student ambassadors. Could you talk a little bit about your student ambassadors and how you utilize them for recruitment at the community college and high school level?

Lily: Yes. Cal Poly Pomona MEP, we used to call it the MEP Program, is now the center for gender diversity, gender diversity in student in excellence. That allows us to have several different programs under the umbrella of the MEP.

We started this very first year – this is the just the first year, I'll admit – an MEP ambassador's program. It's the newest of our strategies and it's a leadership development program for students of color and women to develop their voice. It was designed to help students develop leadership skills. We do so by connecting them with administrators, engineering industry leaders, other key individuals from R1 institutions (the research ones). So part of the push is trying to get our minority students to also consider graduate school.

Currently, I believe – and Donna, you'll have to check me or I'll check later, NSF indicates from their the last stats report no more than 3% of color who were graduates in the STEM fields actually go on to graduate school.

So Cal Poly Pomona, we were very fortunate. I am co-principal investigator. Dr. Ben Barr is principal investigator on a new program promoting post-baccalaureate opportunities for Hispanic Americans. And we call it MENTORES – Mentoring, Educating, Networking, Thematic Opportunities for Research and Engineering in Science.

That particular program is funded by the Department of Education. It's a Title V, \$2.5 million program project, and that will serve MEP. Our ambassadors are involved in that program. And what they do is they will be trained to give workshops to MEP students about the value of going to graduate school. So that's part of their charge.

They accompany me to conferences. So their airfare, their hotel, their conference participation are completely supported by MEP. The most significant aspect of the ambassador's program, other than getting involved in promoting post-baccalaureate studies is to develop their verbal skills and also their writing skills.

We also offer a number of different leadership soft-skills workshop for our ambassadors. Overall, they are the voice of the students and I think it's important that any program that aims to help minority students have minority students at the forefront.

I, as the administrator, have to be in the background. I can't always be highlighted. So in the ambassadors program, we've got a lot of students who are interested and potentially, we will have more in the coming year. But thank you for asking about that.

Donna: That sounds great. Once again, this is a plug for Dr. Mary Anderson-Rowland who has done lots of work with getting her transfer students in particular to go to graduate school. I'm trying to remember

the exact number. I think it's like 50% – really phenomenal. I didn't realize it was as low as 3%. The majority of her students are students of color, underrepresented minorities.

So I think that part of it is so important. I'm looking forward to hearing more as you work on this program and this grant. I want to make sure I leave time for questions. In closing, I know many of our listeners are going to want to recreate the strategies that you've talked about because you've been so successful in recruiting students of color and also women and women of color. What advice do you have for educators who want to recreate these strategies at their schools?

Lily: I'll start by saying do not wait to receive funding. And I think when people hear about the various programs and strategies, the first thing that comes to their mind is “I don't have money.” I'll tell you, Donna, I was at Cal State Long Beach for 15 years. There wasn't a particular woman engineering program, so I just took the liberty of starting one. And it's never, ever a one-person show.

So the idea is to identify your champions. Find people who are like-minded, both in the faculty, the staff, the students, the community members. Have them join you. And if you're hard pressed to find or identify individuals at your own institution, there are so many STEM education support networks like the one where you and I met, the Women Engineering Proactive Network.

I'm chairing the American Society for Engineering Education – Pacific Southwest section this year. And I already, as I was talking with May, the faculty, we're going to be collaborating on proposals.

So back to the point about funding: You have to collaborate. Again, it's not a one-person show. In fact, I'll tell you, a couple of years ago, I was looking for someone to help me with culturally relevant pedagogy. We had used that particular project at Cal State Long Beach through our introduction to engineering program for a number of years but didn't really know what it was called.

I was at a conference in Nashville, Tennessee, and it was the STEM Think Tank Conference, and I met Dr. Rose Pringle. She is from the University of Florida. She's become a good friend of mine now, but she's an extraordinary educator and her expertise, her focus of her research, is on culturally relevant pedagogy. She and I a year later collaborated on offering a webinar.

And so again, don't wait for someone else to take action. Do not wait for a pot of money. You'll be waiting for a long time. If you have passion for something like this, meet people outside the institution; meet people within the institution.

Right now, I feel a lot of institutions who are addressing the call to action to produce more qualified STEM professionals in the field. So you're not going to be alone. I guess that's the bit of advice I can give to anyone who's interested. Again, all these speakers you have on our Telesummit, we're all sources of support.

Donna: Yeah, that is great advice. I always find myself doing the things that I want to get funded in the future, somehow finding a way to do it. This Telesummit was not really something that was planned specifically. We have webinars and I made it into a Telesummit because I thought it was so important. I'm in complete agreement with you about finding ways to incorporate these things right now – imperfect action.

Okay, so let's go now to our questions and I see that we have several. The first is actually about funding. How do you get funding the Engineering Scholar's Day?

Lily: Southern California Edison is one of our primary supporters. They provided the college with a \$100,000.00 endowment. So I know that sounds easier said than done, but prior to that, the college used their own funding to facilitate the Engineering Scholar's Day.

Southern California Edison is a big supporter of our program. The Engineering Scholar's Day is paid through other pots of money through our dean's office. I have to really applaud our dean's office for setting aside that level of support. The women's reception in the Engineering Scholar's Day, I wanted to clarify, is that which is funded by Southern California Edison.

For those who come from institutions where funding is limited — and that's probably the majority of us — the advice is to start looking at all of the engineering industries. They want to have the best and brightest employees. There are cyber grants that you can get online, and I do it all the time — I plug in a mini-proposal. It's another \$10,000.00 here, \$45,000.00 there. Any little bit counts.

It may be that you will fund one event through various pots of money. So start looking at industry for support and you'll find that they will be very supportive.

Donna: Great advice. Our next question: if your university has 20% Asian population, how does this group contribute to your overall success?

Lily: The Asian students do very well in terms of their four-year graduation rate. Right now, they're about 50% graduating in the sixth year, and to a lesser extent, the Hispanics and African-Americans. But again, there are students who don't do fairly well and there are support services within the college for those students. So for that very reason, MEP does not target Asian students, but we do target Hawaiian students, Pacific Islanders, whose graduation rates are much lower than our East Asian students.

Donna: Okay, and last question in the time that we have: is it necessary to have a college-wide initiative to increase diversity in our STEM programs? Or can my department do something on its own to increase diversity in our classes?

Lily: Certainly. It's always better if you have the dean's office supporting, but I think that there's a great value to having the department's support. In fact, one of the areas of great interest is to make sure that diversity is inculcated not only at the college level, but also at the department level.

Again, as I mentioned earlier, this is not a one-person show, one-college show. Diversity is something we all have to do. So I completely support the idea of having a department-level diversity initiative.

Donna: Okay, great. And actually, one more question and then we'll close. There are sometimes misconceptions about STEM majors. How do you actively recruit students, as well as give them a realistic expectation of the STEM programs?

Lily: Beyond the K-12 outreach we do, certainly there are students at the high school and even at the community college level that misperceive what engineering is. Again, that goes back to the difference between outreach and recruitment. Outreach is really career explorations. What is engineering all about? The recruitment piece is woven to an admission element. And so depending on the focus of

your institution's recruiting admission goals, it might be that you provide car monographs at the career center. There's often a career center at each university. They tend to work on the back end of placing students in industry. That's another campus source support for providing information to students who are ready to apply.

Again, it is at all levels. There's so little information out there about what engineering is. But I think in the last 10 to 15 years we've done a pretty good job and the momentum for really educating the general public on what engineering is has increased.

Donna: Yes, I agree. And I hope that our symposium, our Telesummit, has helped with that as well. I have to say I so appreciated all of the rich information that you provided us in our hour together. Thank you so much for your participation in the STEM Success for Women Telesummit.

Lily: Thank you very much, Donna.