Championing Academic Success at a Community Community College for STEM Minoritized Students, Research and Practice

> Marina L. Ramon, PhD STEM Project Director Christina Ortega, MS STEM Academic Counselor





# Presentation Outline

- Overview Of Cabrillo College & STEM Initiatives
- USDE Title III HSI STEM Grants
- STEM Success Coaching Service
- Math Plus & SI
- NSF S-STEM
- Engineering Abroad Program
- Q&A





# Cabrillo College

Mission Statement: Empower students, to be effective communicators, critical thinkers, and responsible world citizens. With a commitment to quality and equity, we connect all learners t pathways that propel them from where they are to where they aspire to be...

- Aptos & Watsonville Campus
- HSI since 2009: ~ 45% of students are Latinx
- Head Count: ~ 11,000/semester
- 35% full-time
- FTES: ~ 4,000/semester





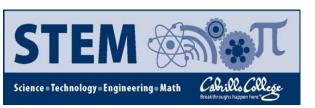
### USDE HSI Grants Awarded

<u>Title V:</u>

- 2009 2014: <u>Student Transitioning in Academic: Reaching Success (STARS)</u>
- 2015 2020: <u>Closing the Completion Gap</u>

<u>Title III:</u>

- 2011-2016: Scaling Up What Works to Promote STEM education access, success, and progress
- 2016 2021: Sustainability in STEM





# Scaling Up What Works to Promote STEM education access, success, and progress – Title III 2011-2016

#### Student Services:

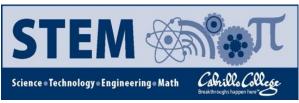
- Centralized location for STEM tutoring, advising, workshops, faculty office hours
- Other STEM academic resources books, computers & laptop check-out, noise canceling headphones
- STEM Peer leaders embedded in CS, CIS, Engr & ETech courses
- STEM Summer Bridge

#### Endowment:

• Establish with Cabrillo College's Foundation - \$160K STEM endowed scholarships

#### Articulation:

• Engineering and Computer Science transfer pathways with regional universities









"I'm convinced that I hang out with a bunch of dreamers. Some are here with their own dream, some have the dream impressed upon them by their parents, to achieve a better life, and some are looking for a dream to follow, but most importantly, they are in a place where their dream will be nurtured and encourage by the staff of the STEM center." -Hank Lopez EE major



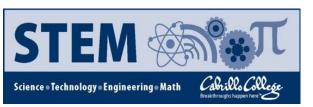






# Institutionalized

- Full-time STEM Center Director
- Tutors in STEM Center
- Counseling & Guidance STEM courses (CG-51 STEM)
- Engineering as Profession course taught each semester (Engr. 3)





# Sustainability in STEM – Title III 2016-2021

#### Academic Programs:

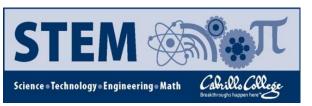
- AgTech: certificates/degrees/transfer
- Environmental Sustainability: certificates/degrees/transfer

#### Curriculum:

 New & revised curricula across STEM disciplines that infuse sustainability, service learning and research projects, and technology

#### Student Services:

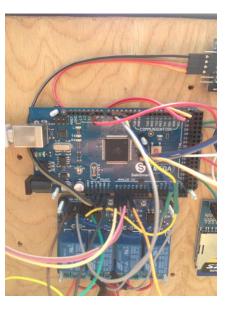
- STEM tutoring & peer leaders for new/revised STEM curricula
- STEM academic and transfer advising (Institutionalized)
- Individualized STEM peer-peer coaching













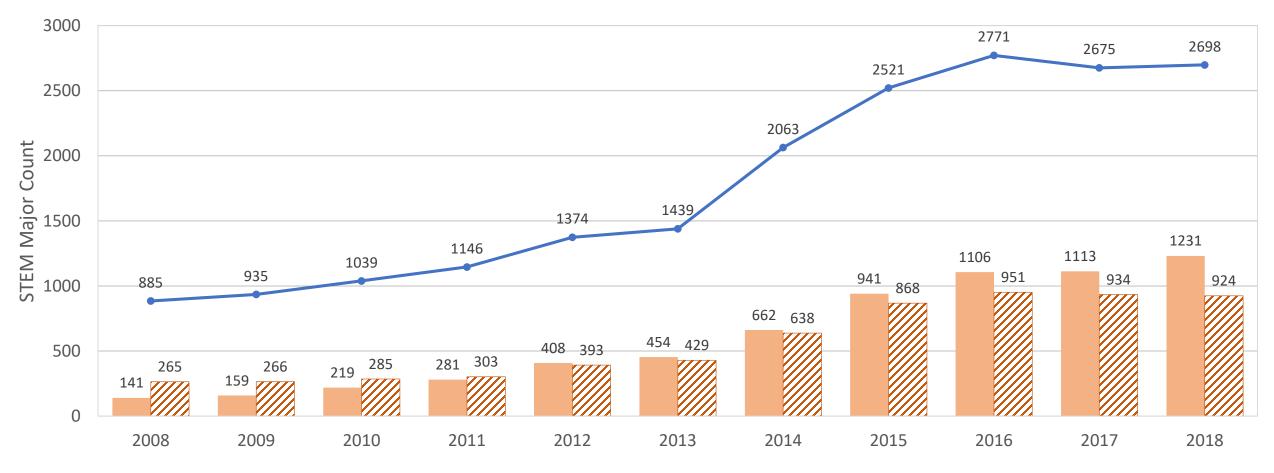


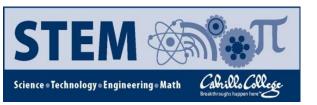




#### **Increasing STEM Majors and Diversity**

Latino STEM *Methode STEM* --- All STEM Majors

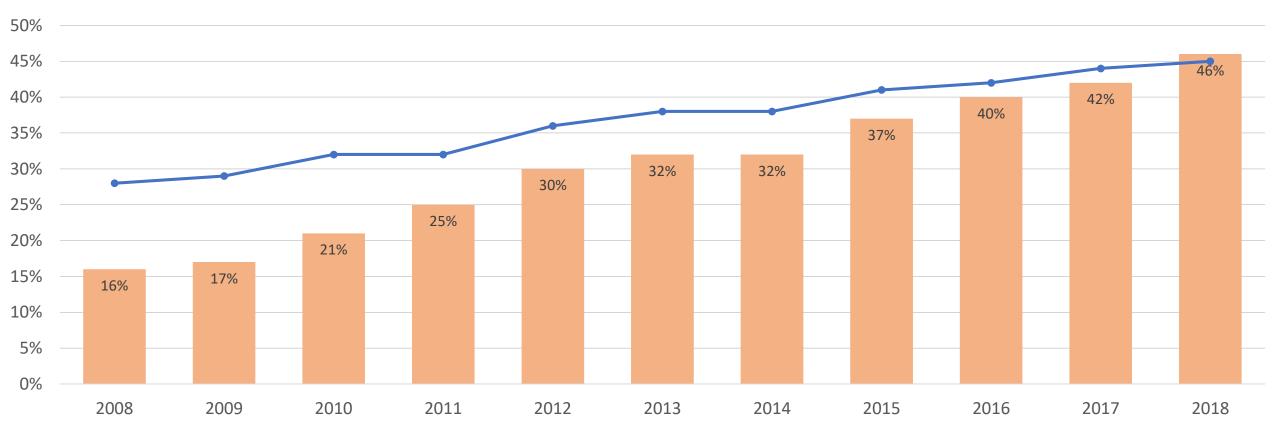


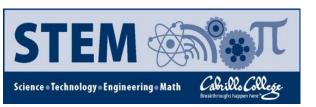




#### **Approaching Representation**

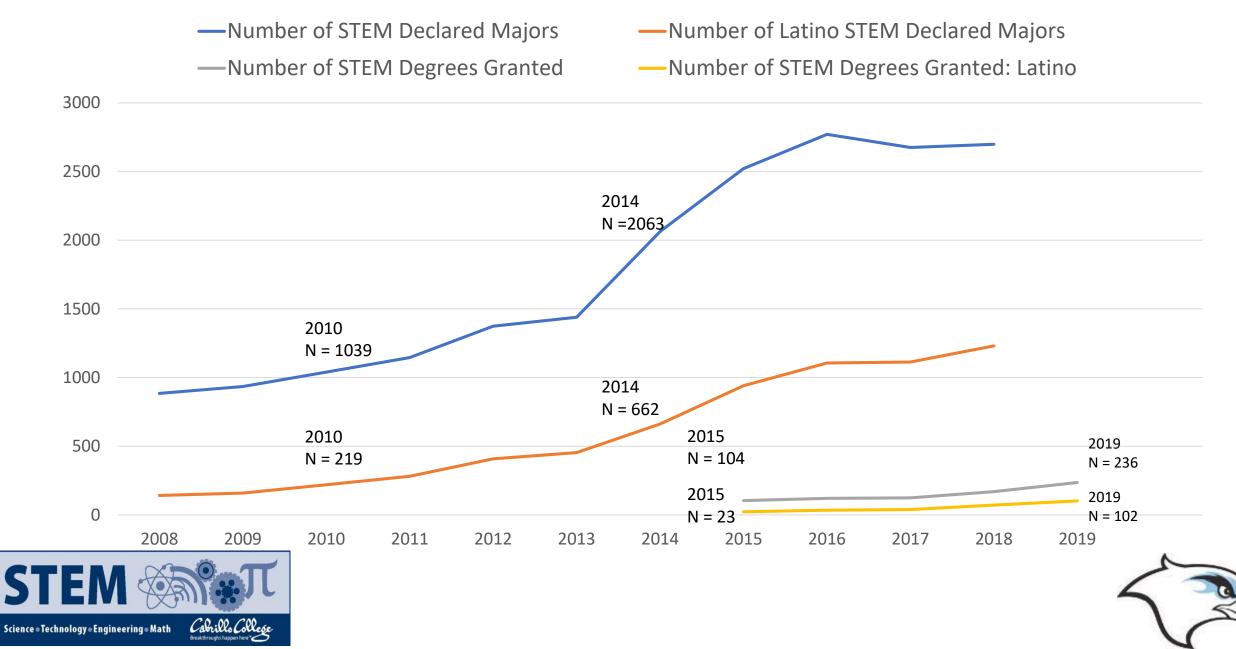
Percentage of STEM majors who are Latino
Percentage of Latino students at Cabrillo



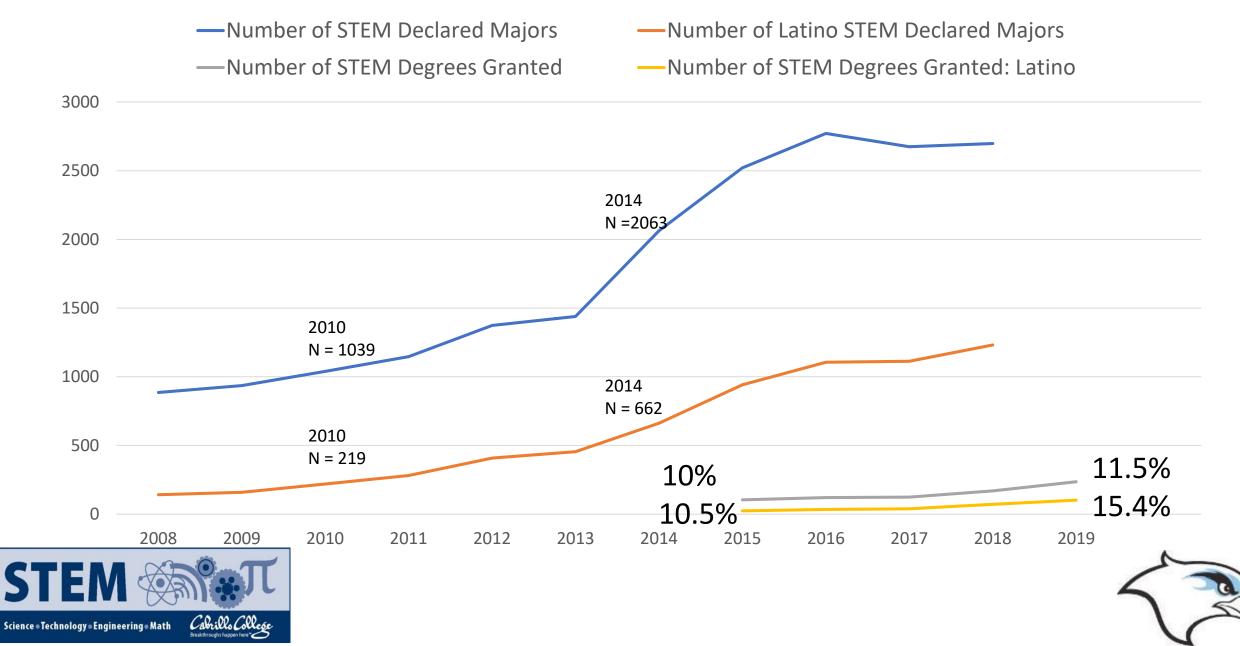




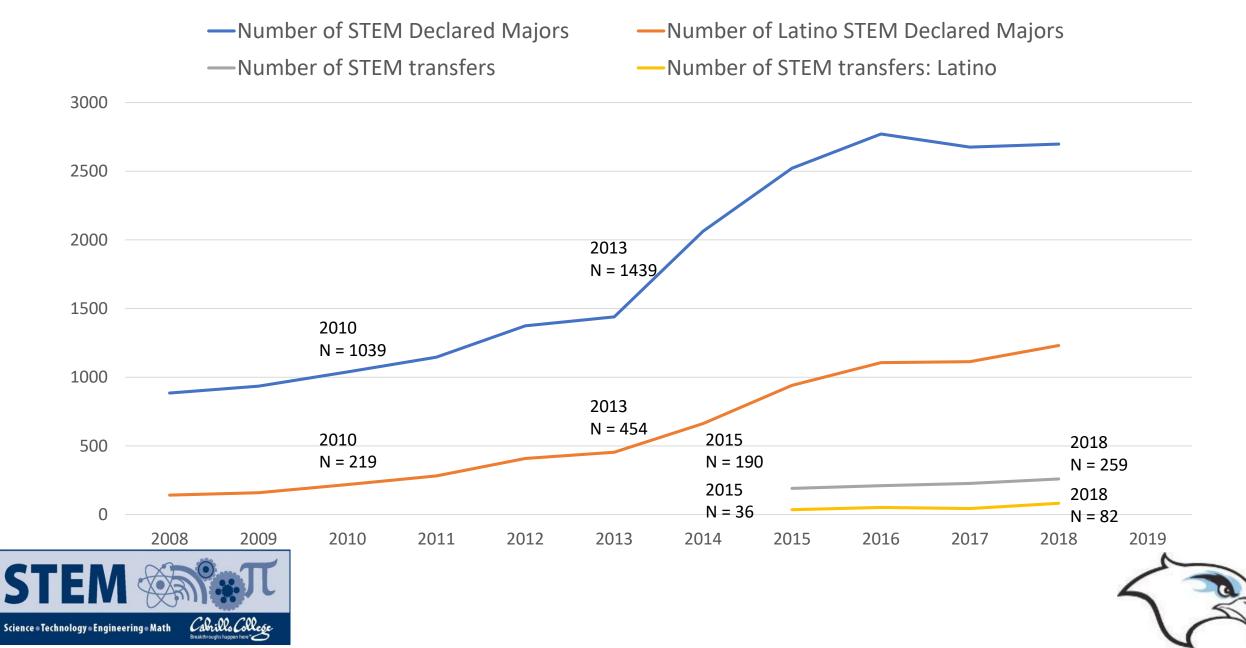
#### STEM Declared Majors vs. Degrees Granted



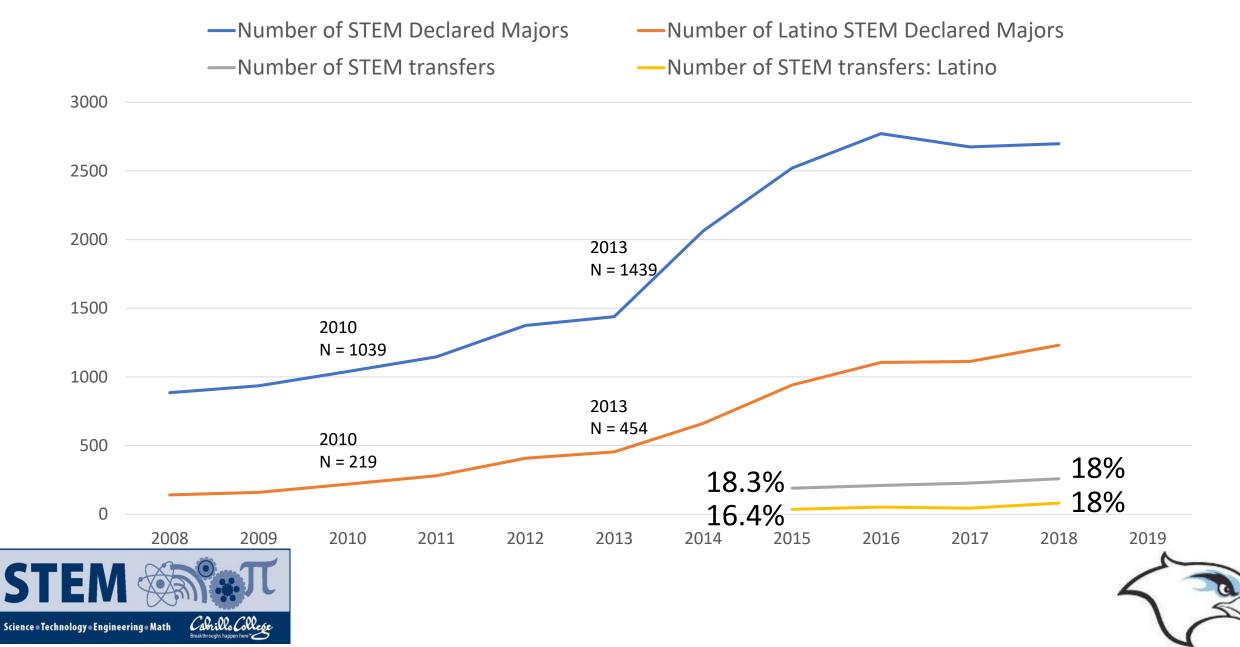
#### STEM Declared Majors vs. Degrees Granted



#### STEM Declared Majors vs. STEM Transfers



#### STEM Declared Majors vs. STEM Transfers





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					Headcount
Term	Total Headcount	Latino Headcount	Latino Percent	Female Headcount	Female Percent
2008F.^	15902	4488	28 %	9008	57 %
2009F	15198	4480	29 %	8504	<mark>56</mark> %
2010F.	14343	4592	32 %	7902	55 %
2011F.	13719	4728	34 %	7587	55 %
2012F.	13363	4950	37 %	7322	55 %
2013F.	13244	5087	38 %	7180	54 %
2014F.	13089	5156	39 %	7177	55 %
2015F	12788	5265	41 %	7083	55 %
2016F	12398	5219	42 %	6751	54 %
2017E	11987	5260	44 %	6558	55 %
2018F. 🗸	11648	5248	45 %	6397	55 %
< >	11418	5374	47 %	6322	55 %

#### Declared Majors

Term	Declared Majors Headcount	% Declared Majors	Declared Majors Latino H	% Latino with Declared	Declared Majors Female	% Female with Declared Major
2008FA	4445	28 %	823	18 %	2455	27 %
2009FA	4440	29 %	882	20 %	2405	28 %
2010FA	4957	35 %	1312	29 %	2601	33 %
2011FA	5226	38 %	1524	32 %	2742	36 %
2012FA	5757	43 %	1921	39 %	3008	41 %
2013FA	5562	42 %	1920	38 %	2838	40 %
2014FA	7872	60 %	3000	58 %	4184	58 %
2015FA	8448	66 %	3450	66 %	4588	65 %
2016FA	8813	71 %	3714	71 %	4745	70 %
2017FA	9229	77 %	4079	78 %	4961	76 %
2018FA	10042	86 %	4633	88 %	5488	86 %
2019FA	9864	86 %	4771	89 %	5479	87 %



STEM 1 Baseline Table II STEM 2 Baseline Enrollments

STEM 2 Baseline Degrees STEM 2 Baseline Transfers Glossary





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Home Dashboards STEM Dashboard

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Term	STEM Enro	Latino STE	Latino Low-I	Latino Non-Low	Non-Latin	Non-Latino Lo	Non-Latino Non	Low Income	Latino % STE	Non-Latino Lo
2008FA	10541	3152	456	2696	7389	597	6792	10 %	30 %	6 %
2009FA	10843	3287	566	2721	7556	759	6797	12 %	30 %	7 %
2010FA	9930	3257	665	2592	6673	750	5923	14 %	33 %	8 %
2011FA	9791	3362	797	2565	6429	852	5577	17 %	34 %	9 9
2012FA	9626	3633	1034	2599	5993	968	5025	21 %	38 %	10 9
2013FA	9758	3949	1476	2473	5809	1240	4569	28 %	40 %	13 9
2014FA	10019	4177	1925	2252	5842	1759	4083	37 %	42 %	18 9
2015FA	9864	4367	2650	1717	5497	2270	3227	50 %	<mark>44 %</mark>	23 9
2016FA	9548	4413	3351	1062	5135	2706	2429	63 %	46 %	28 9
2017FA	9454	4620	3594	1026	4834	2574	2260	65 %	49 %	27 9
2018FA	10358	5164	4106	1058	5194	2794	2400	67 %	50 %	27 9
2019FA	7550	3756	2910	846	3794	1945	1849	64 %	50 %	26 9

STEM 1 Baseline Table I STEM 1 Baseline Table II STEM 2 Baseline Enrollments

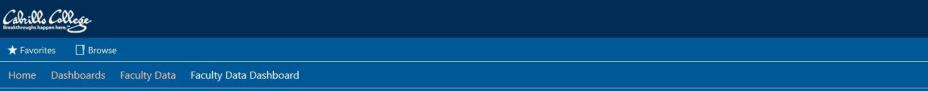
STEM 2 Baseline Degrees STEM 2 Baseline Transfers Glossary



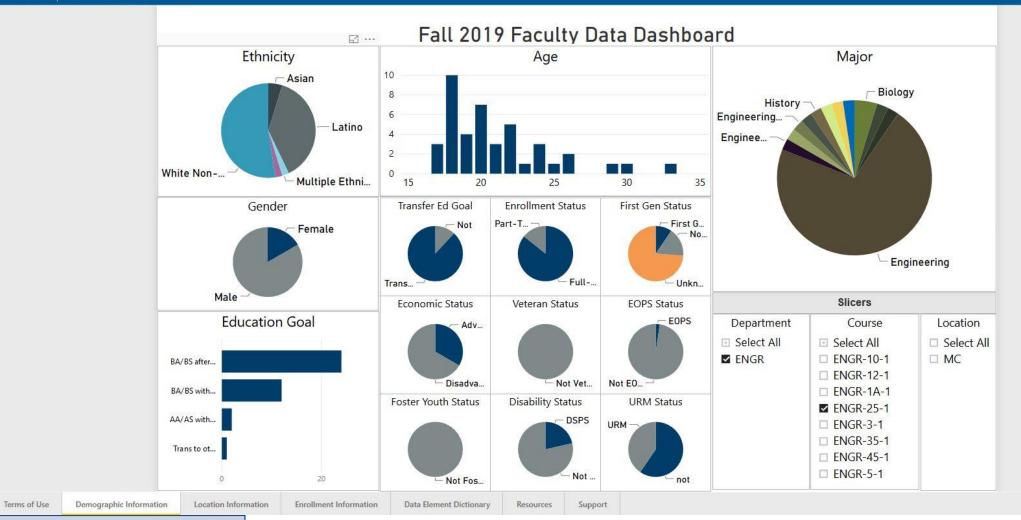


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Marina Ramon

Comments

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#### ABOUT ACADEMICS/CAREERS ADMISSIONS CLASS SCHEDULES REGISTRATION WEBADVISOR

Most sought pages ...

#### STEM @ CABRILLO

STEM Programs STEM Center Faculty & Tutor Schedules **Transfer Planning** Explore STEM **Education Planning for STEM Transfer Students** See a Counselor Help with Math Student To-Do Lists Events Internships Student Clubs STEM Summer Program STEM Success Coaching Service What is Coaching? Meet the Coaches Request a Coach STEM Grants Dashboard (login rqrd)



#### **STEM Success Coaching**

Cabrillo colleges new STEM Success Coaching service is designed to support STEM students as they navigate their new environment and learn how to succeed both academically and personally. You will receive one-on-one attention from a peer Coach who is committed to your personal development and success. Your STEM Success Coach will work with you to achieve the fullest college experience possible: improving effectiveness in and out of the classroom, building leadership skills, creating balance and managing stress, boosting self-confidence, and developing goals for the future.



What is Coaching?



Meet the Coaches



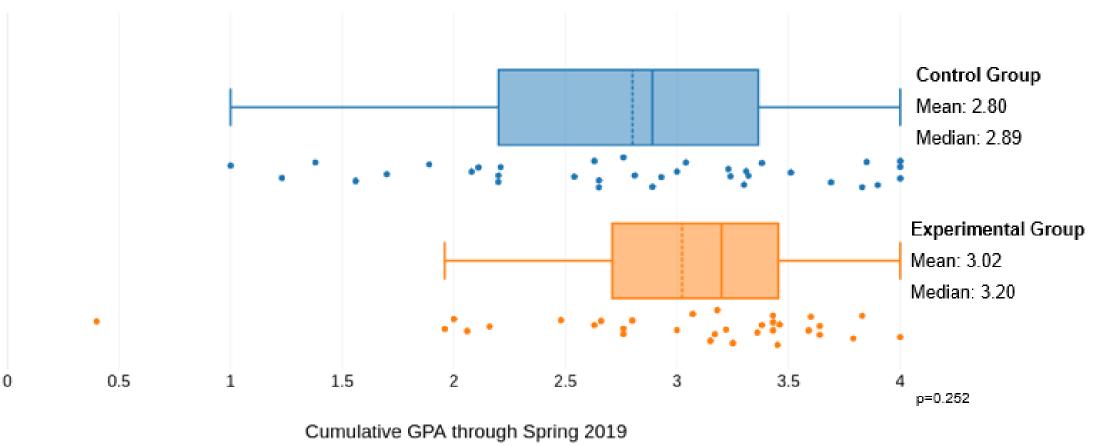
Request a Coach





Webpage: https://www.cabrillo.edu/services/stem/coaching.html

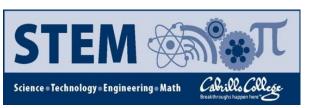
### STEM Success Coaching – Student GPA



Note: mean is represented by dashed line, median is represented by the solid line.

Control Group N = 35

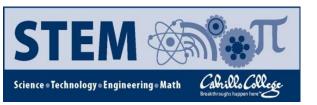
Experimental Group N = 31





# **STEM Success Coaching Service**

- "I loved the way it worked out, very open ended and friendly. Major props to my STEM coach for being rad!"
- "I think many kids who are really struggling to keep themselves on track could really benefit from this program...
- "STEM coaching was a good way to make sure you really got your personal assignments, time management, and future goals in order."





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# Math Plus Program

 One-week Intensive Review of Math prior to each semester at our Watsonville & Aptos Campus

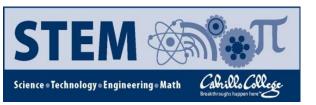
#### 2016 Cohort (N=408)

#### Retesters (N=68, 17%)

- 75% (51/68) Placed in higher level of math class after Math Plus
- 77% (52/68) Enrolled in math course for Fall semester after Math Plus
- 64% (33/52) Passed Math course with a "C" grade or better

#### Reviewers (N=340, 83%)

- 74% (251/340) Enrolled in Math course in Fall16/Sp17 after Math Plus
- 69% (172/251) Passed Math with a "C" grad or better





### Supplemental Instruction

S	SI Success for	Spring 20	19: 3 y	ear Avg., UF	RM, and	d SI vs.	Non-Sl	comp	arison			
	Course	# students	Overall Course Success	Under Represented Minorities Success	A	В	с	D	F	NP	Р	w
3 yr. avg. 2016-2018	BIO-4		66.5%	55.0%	34.6%	20.9%	11.0%	4.1%	4.5%	5.6%	0.1%	19.29
Spring 2019	SI only: SP 19	241	66.8%	58.3%	34.9%	21.6%	10.0%	3.7%	7.1%	0.0%	0.4%	22.49
3 yr. avg. 2016-2018	CHEM-30A		70.1%	n/a	19.0%	30.4%	20.4%	6.4%	6.3%	0.4%	0.4%	16.89
Spring 2010	Non-SI sect.	57	75.4%	70%	26.3%	29.8%	19.3%	7.0%	1.8%	0.0%	0.0%	15.89
Spring 2019	SI sect.	70	81.4%	80%	28.6%	35.7%	17.1%	4.3%	0.0%	0.0%	0.0%	14.39
3 yr. avg. 2016-2018	CHEM-3		62.5%	n/a	15.8%	24.4%	22.0%	8.8%	12.8%	0.6%	0.3%	15.2
Envine 2010	Non-SI sect.	56	46.4%	47%	5.36%	12.50%	28.57%	5.36%	3.57%	1.79%	0.0%	42.99
Spring 2019	SI sect.	105	61.0%	58%	14.29%	22.86%	22.86%	5.71%	15.24%	0.00%	1.0%	18.19
3 yr. avg. 2016-2018	CS-11		69.5%	n/a	33.3%	14.3%	6.7%	3.5%	5.4%	5.7%	2.3%	11.69
Carling 2010	Non-SI sect.	43	72.1%	65%	34.9%	27.9%	7.0%	0.0%	16.3%	0.0%	2.3%	11.69
Spring 2019	SI sect.	37	64.5%	58%	27.0%	18.9%	16.2%	5.4%	8.1%	0.0%	0.0%	24.39
3 yr. avg. 2016-2018	MATH-12		58.8%	n/a	18.9%	21.6%	18.0%	5.2%	11.2%	2.4%	0.4%	22.49
C	Non-SI sect.	545	47.9%	44%	13.2%	18.0%	16.5%	5.7%	17.6%	0.0%	0.2%	28.89
Spring 2019	SI sect.	367	<b>63.2%</b>	61%	16.1%	23.7%	23.4%	5.7%	13.1%	0.0%	0.0%	18.09
3 yr. avg. 2016-2018	MATH-152		43.6%	n/a	9.8%	14.9%	18.9%	8.5%	20.8%	0.0%	0.0%	27.0
	Non-SI sect.	343	34.4%	28%	7.3%	10.5%	16.6%	4.4%	22.7%	0.0%	0.0%	38.59
Spring 2019	SI sect.	223	46.2%	46%	10.8%	16.1%	19.3%	8.1%	12.1%	0.0%	0.0%	33.69



#### **Supplemental Instruction**



#### Supplemental Instruction Program

#### Dear.

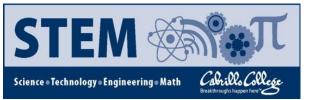
It was a pleasure meeting you today at... As I mentioned to you earlier, the Supplemental Instruction (SI) program is currently recruiting SI Leaders for Fall 2018 and needs your help identifying students who are outgoing, have strong biology skills, and earned an "A" or "B" in the following classes: Bio4, 5 and 6, and Bio 11A and B. Your involvement and support of the SI Program is vital and the biology faculty are our best source for finding qualified SI Leaders and referrals.

In particular, we are looking for SI Leaders who share similar background and experiences with our growing Latino/a student population. Cabrillo was designated a Hispanic Serving Institution (HIS) in 2006, reflecting the great responsibility that the College has to the educational attainment and economic well-being of the surrounding community. For example, in Fall 2016, 54% of incoming students were from underrepresented minority groups, with 42% of Latino/a descent. We are seeking any SI Leader who is outgoing and confident working with diverse populations with a specific emphasis on Latino/a students, our largest minority population.

Please email me with any student you would like to recommend or have the student email me at my contact information below. This position pays \$13.75 an hour and students work 10-12 hrs. per week on average. Students get paid to attend class and prepare SI sessions. Thank You for your support!

Ricardo Espinoza Program Coordinator





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# Grant funded by the National Science Foundation (NSF Award #:1456035)

- March 2015-February 2020
- Awards 15-20 students per year
- \$6,700/yr scholarship
- Students can receive scholarship for up to 3 years
- Application requirements:
  - Engineering major and transfer bound
  - Must be enrolled in at least 12 units
  - Must have a cumulative GPA of 3.0 or better
  - Must have an unmet need from FAFSA
  - Must be eligible for Federal PELL Grant

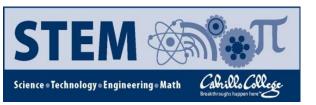






# Goals & Objectives

- Increase the number of full time engineering majored students transferring to a 4-year university.
- 2. Shorten the time to degree for students financially challenged in a clear Engineering pathway.
- 3. Augment the financial support and professional outlook of students committed to achieve clear academic pathway.
- 4. Strengthen and enhance the current services as well as expand and add new support activities to ensure strong academic and professional atmosphere for scholars.
- 5. Promote to higher success, retention, enrollment and persistence among academic talented yet financially challenged students.

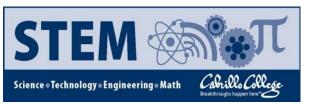




# Staying on the Path

<u>Required</u> Activities:

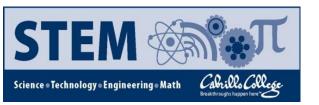
- Two appointments with assigned S-STEM counselor (who is also the STEM counselor)
- Mid semester progress reports
- Five enrichment activities
  - Academic Excellence Workshops, Supplemental Instruction, campus events, financial aid, application workshops
- Pairing and meetings with mentors: upper division student or alumni and engineering faculty
- Connection with academic support & student services early on and throughout their academic career





# Results so far.....

- 39 students have been granted the scholarship
- 89.7% of scholars are either on track or have transferred in 3 years after receiving the scholarship
  - 2 transferred in 4 years
  - 2 had to go to part time status for family obligations but plans are still to transfer
- 88% of students felt that they would have had to work more if they had not received the scholarship
- 76% of students responded positively when asked if the enrichment activities were interesting and helpful
- 82% of students felt they were more productive and effective as a result of the scholarship





# Where are our students now?

- UC Berkeley
- UC Davis
- UC Irvine
- UC Santa Barbara
- Cal Poly San Luis Obispo
- Sacramento State University
- San Jose State University



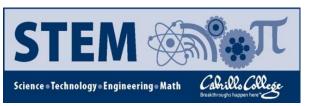


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SACRAMENTO STATE





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### **Engineering Abroad Program**



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# **Engineering Abroad Program**

Structure	Description
Selection Process	Based on
	· Engineering Major
	· Full Time Student
	Completion of Some Engineering Coursework
	Diversity in Gender and Ethnicity
	· Service/Leadership at Cabrillo
	<ul> <li>Skills: Language, Communication, Building</li> </ul>
Preparation Course	· Team Building
Fall Semester Prior to Experience	Cultural Awareness
(2 hrs/wk)	Health and Safety
	Preliminary Project Design
Guatemala Experience	2 weeks
(January Winter Session)	Engineering Project : 9 days
	Cultural Exploration : 5 days
Culmination Meetings	• Student Reflection and Photo Journal
Spring Semester After Experience	Presentations to Local Professional Engineering Organizations
(2 hrs/wk)	Presentations and Posters at National Engineering Organization
	Conferences





# Engineering Abroad Projects



**Building computer lab** 



Building retaining wall above school



**Restoring soccer field** 



Installing water pump



Installing water tanks





Leveling for tanks

Constructing sediment basin

Water Storage Capacity Prior to Cabrillo's Involvement: 500 gallons Cabrillo Additions: 13,330 gallons Other Additions: 5,500 gallons

**Total Storage: 19,330 gallons** 



Water Storage in Vuelta Grande

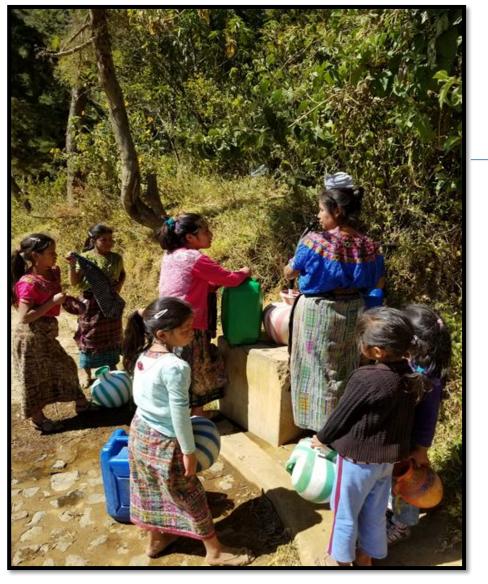
- Water Tank



- Tank Placed by other group

SPRING

- Concrete Tank



Installing water storage tanks with piping to faucets within the community:

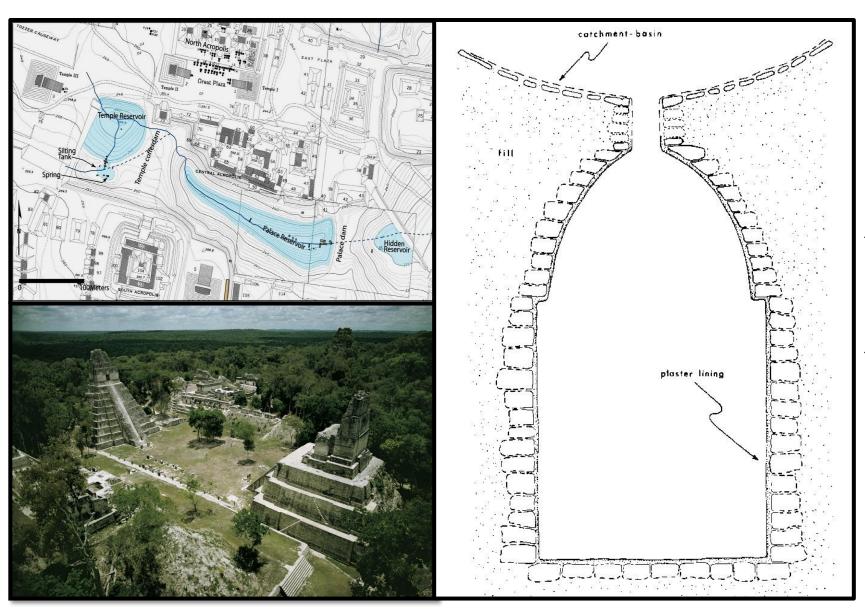
Provides the community with water during the dry season

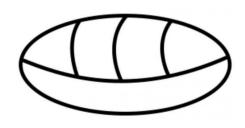
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Reduces the time for the young women to gather water for their families



# Cultural Guatemala Experiences: Tikal





- A portal to an ancient Indigenous World
- Indigenous Innovations

   Mathematics
   system
  - Water cisterns
  - Intentional structures

### Assessment and Evaluation

#### **Quantitative Evaluation**

- Pre/Post Self-Assessment Surveys
- Institutional Retention Data
- Institutional Transfer Data

#### Qualitative Evaluation

- Focus Groups
- ✤ Interviews
- Surveys





#### Engineering Abroad Participant Demographics

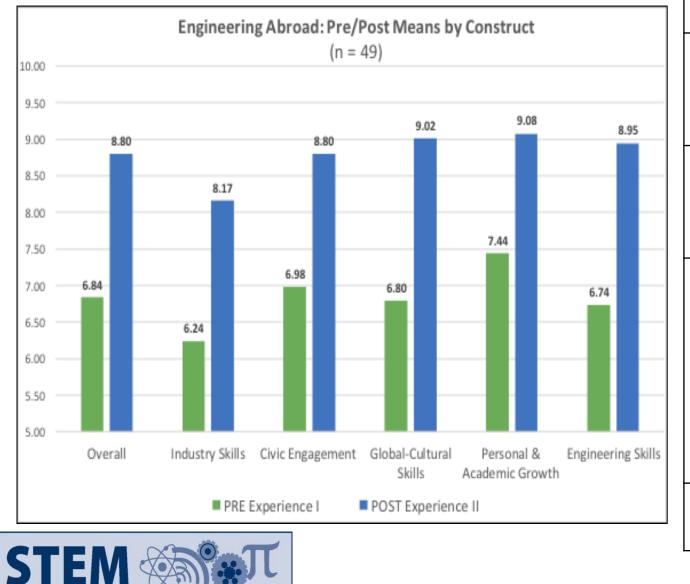
EAP Cohort	Total Students	Average Age (years)	% Female	% URM*	% Latinx	% Low Income
2013-14	11	28	36%	36%	27%	91%
2014-15	14	22	29%	50%	43%	64%
2015-16	14	22	29%	57%	50%	93%
2016-17	10	23	60%	60%	40%	100%
Overall	49	24	37%	51%	41%	86%

\* URM includes African Americans, Native Americans, Latinx, and Pacific Islanders





## Self Assessments

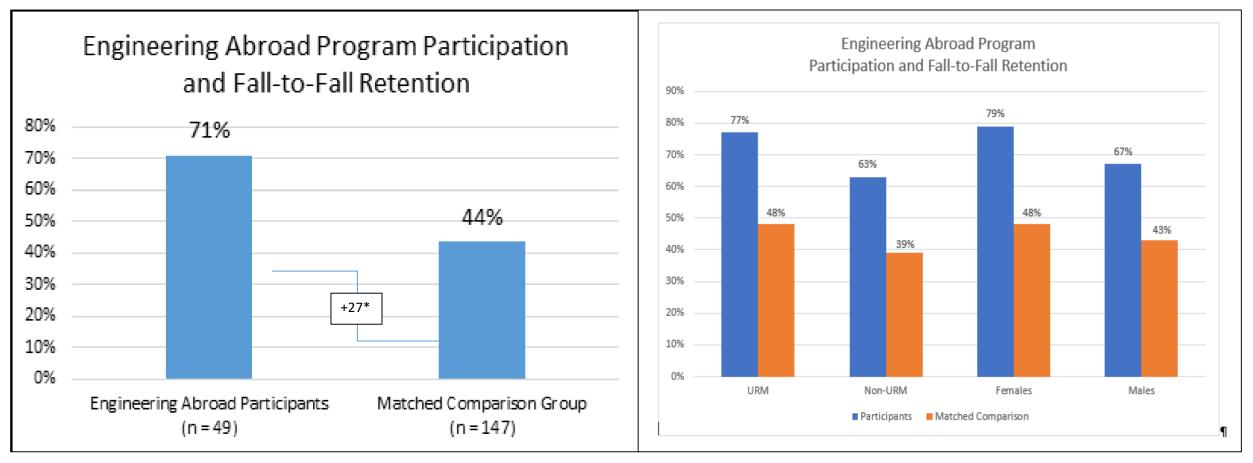


Industry Skills	1. Team Work
	2. Project Management
	3. Presentation Skills
	4. Comfortable Interacting with Engineers
	5. How Businesses are Run
Civic Engagement	1. Engineering is a helping Profession
	2. Knowledge of Social Issues
	3. Desire to be involved in Community
	4. The Importance of Community Service
	5. Awareness of Community Needs
Global/ Cultural Skills	1. Comfortable interacting with people from
	different cultural backgrounds.
	2. Connection to a "World Community"
	3. Knowledge that Engineering is global
	4. Work Effectively in a diverse environment
	1. Personal Satisfaction and Growth
	2. Connection with other students
	3. Confidence in facing challenges
	4. Development of empathy
Personal	5. Build confidence in ability to make a difference
Growth	6. Motivation to complete your engineering education
	7. Enthusiasm for the Engineering Profession
	8. Solidify classroom concepts
	1. Knowledge of Sustainable Design
Engineering	2. Real-life applications of Engineering Principles
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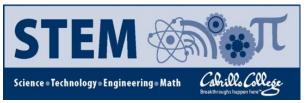
Science • Technology • Engineering • Math

Cabrillo College Breakthroughs happen here

## Retention

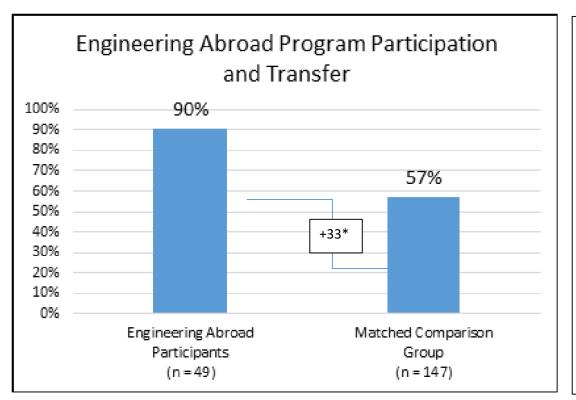


\*Differences are statistically significant at the p < 0.01 level



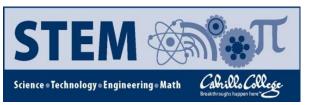


## Transfer



Engineering Abroad Program Participants and Transfer Rates 120% 100% 100% 92% 88% 85% 80% 60% 57% 55% 53% 60% 40% 20% 0% URM Non-URM Males Females Matched Comparison Participants 9

\*Differences are statistically significant at the p < 0.01 level







### ENGINEERING ABROAD PROGRAM OUTCOMES

"I know that something like fixing pipes may not seem like a big deal or a complicated job, but this was the first time in my entire life that felt like an engineer."

STEM Cabrille College

"In Guatemala, I was able to experience Engineering in the field first-hand, and I believe the knowledge obtained from first-hand experience has extreme value."

> "This eagerness has been with me for a long time but I finally got the opportunity to act on it and make a difference by going to Guatemala on the Engineering Abroad experience."

" To participate in a program that combined my twin passions of engineering sustainable technologies and serving communities, pushed me to strive for a new level of professionalism in my classes and in my social life. "

"Observing the Guatemalan culture encouraged me, as a person, to look beyond my circumstances and to take joy in all things." "Abroad and the engineering courses I've taken at Cabrillo, have helped me gain the experience and skills I need to successfully transfer and do meaningful work."

"I definitely feel ever more committed to my career as an engineer to help solve different problems faced by different communities all over the world." "Helping people in such a tangible way is fulfilling, it makes me want to do more to improve health, access to clean water and joy."



## Cabrillo Engineering Abroad







## Thank you to our Sponsors



NSF Award #: 1446430

Engineering Faculty Engagement in Learning through Service (EFELTS)

benjamin a. GILMAN

INTERNATIONAL SCHOLARSHIP





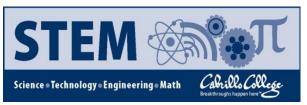
Global Technology Institute San José State University, College of Engineering

American Council of Engineering Companies

ACEC

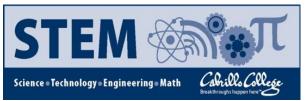
California





## For more information...





Website: http://http://www.cabrillo.edu/academics/engineering/engrabroad/



# Presentation Outline

- Overview Of Cabrillo College & STEM Initiatives
- USDE Title III HSI STEM Grants
- STEM Success Coaching Service
- Math Plus & SI
- NSF S-STEM
- Engineering Abroad Program
- Q&A



