

# Science Learning Institute Program Review 2022

## A. Program Information

### Program Mission Statement

1. Please enter your mission statement here.

The Science Learning Institute’s mission is to **advance equity and diversity in STEM** at Foothill College by supporting students from underrepresented groups in their academic and career pathways in STEM and through initiatives working with faculty, within the institution, and in partnership in the community.

### Program Level Student Learning Outcomes

2. Please list the program-level student learning outcomes.

1. Students who participate in PRE-STEM will persist in their STEM courses at Foothill each quarter.

### Program Level Student Area Outcomes

3. Please list the program-level student area outcomes.

1. Students who participate in SLI internships (winter and summer) will have more confidence to apply for another internship or other out of class experience related to their major/ discipline.
2. Students who participate in SLI activities and programs will report more sense of belonging and community and confidence in reaching their STEM-related goals (major, transfer, getting a STEM job)

## B. Persistence in STEM

	2017-18	2018-19	2019-20	2020-21	2021-22
<b>Total</b>	no data	3 (27%)	15 (68%)	82 (83%)	188 (79%)

4. Why is this outcome important?

Research says that a learning community makes a difference for students from underrepresented groups. In PRE-STEM, we put a lot of time and effort into creating a welcoming community and students are participating in biweekly cohort sessions for no credit. We want to see if this is making a difference for students’ persistence in school and their courses.

5. How will this outcome be measured?

Track STEM courses for each student each quarter – do they stay, do they pass? How does this compare to the rest of the student population?

The data set provided above is the overall course success for students in STEM courses in the PRE-STEM cohort from 2021-22 (total 22 students).

This is not exactly the data set I am hoping to obtain for the future. However, I was able to see that the course success over time was better than the overall Foothill populations STEM course success (see table below - course success for overall Foothill population in STEM classes).

	2017-18	2018-19	2019-20	2020-21	2021-22
<b>Total</b>	72%	71%	76%	76%	72%

This would be the hope - that students in PRE-STEM would have higher STEM course success compared to the general population.

6. Is there an action plan or next steps?

The sample size of the above data is only 22 students, which is small when compared to the Foothill population. Therefore, we look forward to obtaining more data over time for students involved in SLI programs.

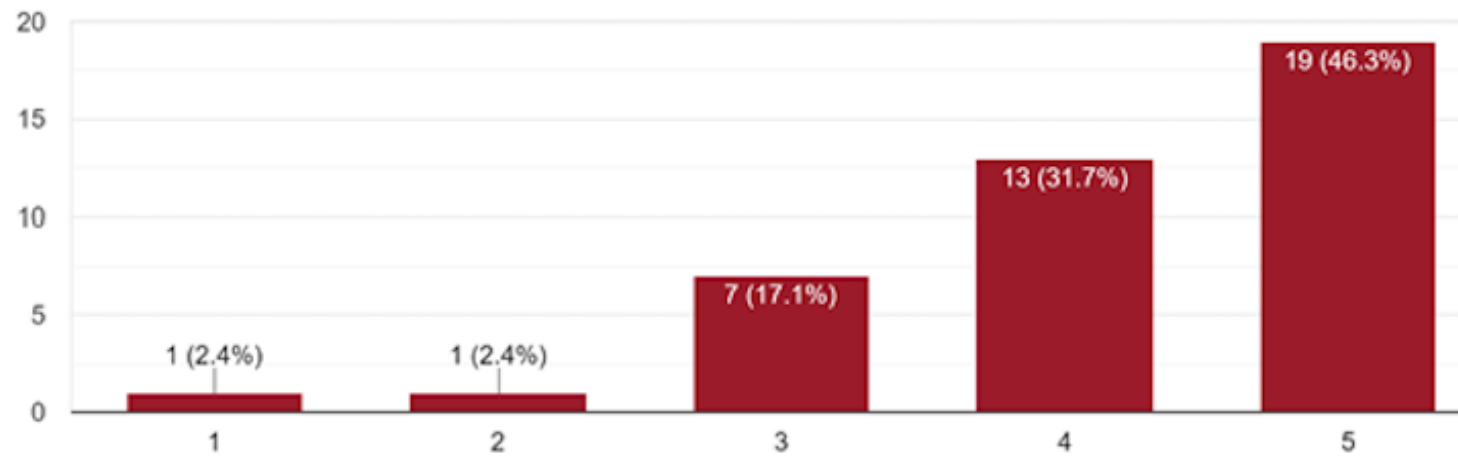
We also hope to obtain more data related to STEM course success - to see from quarter to quarter what course success looks like. We are also adding additional supports such as peer tutoring and a part-time counselor (with funding from MESA) both of which we anticipate will increase student persistence and success in STEM.

With the infrastructure that will be provided by the new MESA program - a dedicated space, part-time counselor, full time program coordinator, and other academic supports that are recommended by MESA (academic excellence workshops, peer tutoring), we expect to not only see our numbers of learning community students increase but also the persistence and course success to increase as well.

## C. Confidence to apply for internships

### SLI STEM Summer 2022 Internship Program - Confidence Survey

How confident do you feel in your ability to secure your next internship/research position?



(N=41)

7. Why is this outcome important?

Research shows that internships and work-based learning experience set an individual up for more internship and job opportunities in the future. In the SLI Internship program, we prioritize accepting students who have not had a prior internship and students from underrepresented groups, and we believe that the SLI internships are really broadening the future workforce with a more diverse population by increasing access to career pathways for low-income, first generation students of color who would not get those early chances.

8. How will this outcome be measured?

End of program survey asking if students have a future internship set up. Track students 6 months later and a year later with a follow up survey.

In the above data table, the question students were asked was "How confident do you feel in your ability to secure your next internship/research position?" and the rating scale was 1 - not at all confident to 5 - very confident. This data were obtained from our summer 2022 SLI internship with a cohort of 41 students. We will continue to ask this question in our final feedback survey.

9. Is there an action plan or next steps?

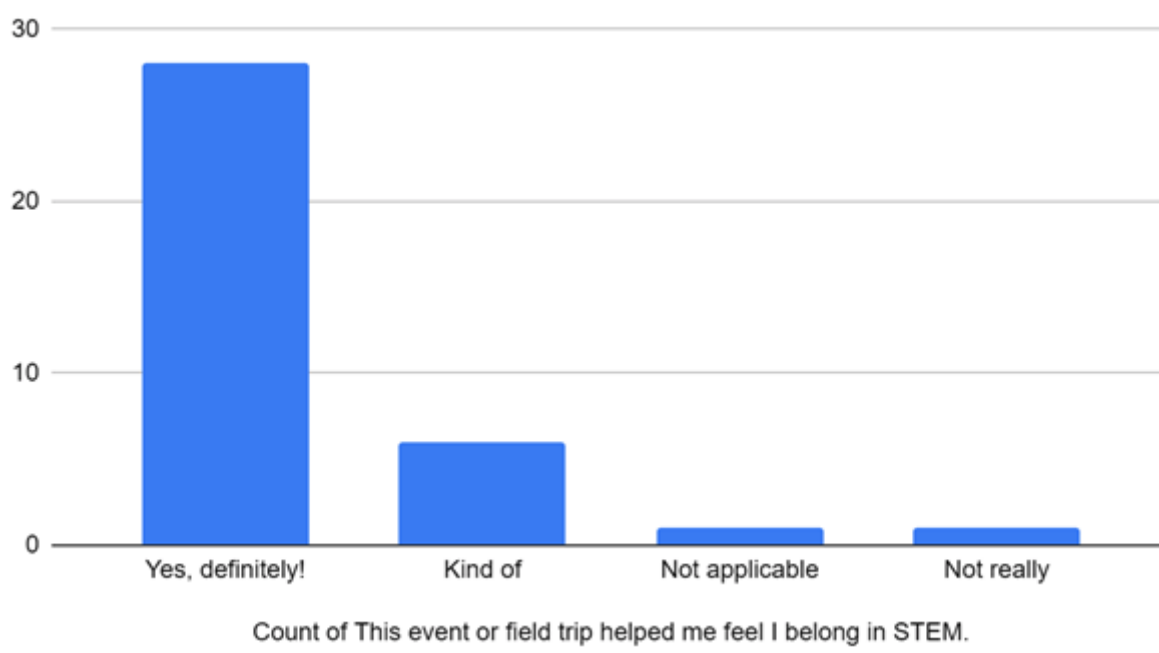
We do not collect this data in summer 2021 for our internship cohort. We did collect it for our summer 2022 cohort (which is past the timeline for this Program Review), so moving forward, we will collect this data point. We are also in the process of creating a follow up survey for all our past student interns to track where they are (most of them are in a transfer institution), whether they were able to secure a subsequent internship or research position, and how the program impacts continue beyond the time of their SLI internship involvement.

We would like to collect more of this kind of data to track the long term effects of our internship but we are limited by not enough staff capacity to create the follow up survey and track down students in a persistent way to collect the data. We are going to be hiring a part-time evaluator this coming spring 2023 to help us do some of these tasks, thanks to the support of the workforce development department.

## D. Sense of Belonging

### SLI STEM Fall 2022 - Belonging Survey

This event or field trip helped me feel I belong in STEM



(N=36)

10. Why is this outcome important?

Research shows that a sense of belonging helps with persistence and retention in STEM. Through our activities, field trips, and events, SLI is creating a community of STEM students at Foothill, and we believe that events, both social and educational, a dedicated space (with the help of the MESA grant which will start at the end of the 2022-23 school year), and intentional community building will contribute to more students persisting in STEM at Foothill.

11. How will this outcome be measured?

Exit survey for all programs/ events to ask the following:

1. Did you feel welcome and included at this event/ program?
2. Would you attend future SLI events?
3. Did this event/ program help you take first steps toward overcoming imposter syndrome?
4. Do you feel this program/ event confirmed your interest in striving toward your STEM-related goal?

In the above data table, we asked the question "This event or field trip helped me feel I belong in STEM" and we were able to capture 36 responses in the fall 2022 through 3 separate events (2 speakers and 1 field trip) and we see the definite preponderance of "yes, definitely" responses. We will continue to implement an event and field trip survey after all SLI sponsored activities to capture this response.

12. Is there an action plan or next steps?

We have not collected this data prior to fall 2022 although "sense of belonging" is something we know that our programs impact. Moving forward, we will collect this data in all our activities and programs.

One of the challenges to collecting this data, especially in our one-off events and field trips is that we do not often get a 100% participant response. We hope to continue pushing out the surveys to get real-time and complete data.

## E. Service Area Objectives Addendum

1. What are the service area strategic program goals for the coming year?

1. Raise funds (goal of 100K) to support STEM internship student stipends to replenish pool of funds for program sustainability.
2. Increase visibility and awareness of SLI among faculty and students. Make sure SLI is a name that is recognized and that our resources are known.
3. Increase number of students from underrepresented groups participating in PRE-STEM, summer institute, and internship program. Ensure that programs are at least two-thirds URM students.
4. Organize at least 2 events each quarter to advance equity and diversity in STEM and highlight voices from underrepresented groups as a role model for Foothill students.

2. What is your implementation plan for the above-mentioned?

1. I continue to write grant proposals to NSF, hoping to get funded, and I also look to apply to state and community funding entities to fund parts of SLI's programs. I am also looking to present (in partnership with the SLI staff and student team) about SLI's internship program in the community to see if we can find individual and corporate donors to support our stipends.
2. As SLI grows, our name recognition grows, and yet I cannot count on our name to speak for itself. I continue to train student leaders to be ambassadors and spokespeople for SLI and our program impact. I continue to present at STEM division meetings to share updates to faculty and seek their support. Additionally, with a new MESA grant, we will have a dedicated space in the STEM Center where we can promote SLI and our programs and grow our community.

- This goal will be an ongoing area of effort and attention. URM students are often the hardest to reach by such outreach methods as email and flyers. Word of mouth, one on one conversations, and targeted outreach are the most successful ways to reach URM students to encourage them to join SLI programs. With the new MESA grant, we hope to have even more capacity to do this one on one outreach because it will enable us to hire a full time program coordinator and a part-time counselor, both of whom will be focused on bringing in URM students to the MESA and SLI programs.
- We make an effort to ensure that our activities and events cater to students from underrepresented groups - whether it is the topic or the choice of guest speakers or even targeted outreach. We will continue to use this targeted focus to center the most marginalized when designing our program activities.

3. What barriers has the department faced in implementing improvement?

Capacity is probably the biggest challenge. Currently, SLI is staffed by one full time director. We have been able to receive funding support from the workforce development department to also support a close-to-full-time internship specialist who is also an engineering faculty member with an incredible amount of skills and experience. Additionally, we have been able to support student staff who are able to support such elements as SLI's social media and administrative tasks. However, without another full-time dedicated staff person, we are limited. There is never enough time to do all the things we want to do to truly reach every student from an underrepresented group at Foothill, and we know they are there - but many have not yet connected with SLI and our resources. Lack of capacity also means limited time for the SLI director to dedicate to fundraising efforts such as grantwriting and donor cultivation to truly expand the funding base for the internship program. Much of the SLI director's time is spent meeting with students and running the day to day programs, and her time is then pulled away from the big picture visioning and planning that needs to happen to keep SLI sustainable for the long term.

Another area is consistent and dedicated funding. Because there is no dedicated line item for SLI in the institutional budget, we rely on donations and a rapidly-depleting Foundation fund for expenses such as the internship stipends that all SLI interns receive, student staff, and other materials and supplies. The MESA grant will be a solid ongoing funding source (for 5 years) but having institutionally dedicated funding would help create a stronger foundation for SLI to grow and expand. We believe we have shown an impactful track record for supporting students from underrepresented groups in STEM at Foothill, and we hope to see commitment from the institution to continue our work.

Capacity (staff, time, dedicated funds) is probably the biggest challenge. Fortunately, SLI receives a lot of moral support from the STEM division and also from senior leadership and the student body. Everyone believes in the work of SLI and that has been helpful in moving our work forward.

## F. Enrollment by Student Demographics

### a. Enrollment by Gender

	2017-18	2018-19	2019-20	2020-21	2021-22
Female	24 (47%)	101 (71%)	174 (57%)	392 (54%)	392 (54%)
Male	27 (53%)	41 (29%)	123 (41%)	250 (36%)	315 (44%)
Non-Binary	0	0	6 (2%)	20 (3%)	13 (12%)

1. What do you observe in the data above? What do you want the college to understand about enrollment by gender in your program?

The table above shows the gender breakdown of course enrollment over the years of students taking part in SLI programs:

- Summer 2021 interns - 32 total
- TechCore Summer Institute 2021 students - 17 total
- PRE-STEM 2021-22 - 22 total
- Winter 2022 micro-interns - 25 total
- total 85 students (unduplicated)

I notice in the data when looking at students involved in SLI programs, the majority of enrollments are female, though the proportion has fluctuated over time. SLI has really been most active between 2020 to the present, so even though some of the SLI students were enrolled in courses before the current director (Sophia Kim) started, their program involvement would have started in the summer of 2020 at the earliest.

SLI sees females and nonbinary folks as underrepresented in certain STEM disciplines - such as physics, engineering, and computer science. In fact, when looking at Foothill student enrollment in STEM courses, the proportion of female and nonbinary students is less than male students. So we are encouraged to see that our proportion of female + nonbinary students exceeds male students. We hope to continue to see these trends over time.

2. Action: What actions does your program plan to take in order to achieve your goals?

We will continue to do targeted outreach to females and nonbinary STEM students. We have been able to have IR create an Argos report for us that allows us to see students who apply to Foothill with demographics such as race and gender broken down. We will continue to do

targeted email outreach with this report.

3. Needs: What does your program need to execute this action plan?

At this time, we have all that we need to continue doing this targeted outreach to females and nonbinary STEM students.

## b. Enrollment by Ethnicity

	2017-18	2018-19	2019-20	2020-21	2021-22
African American	0	0	2 (1%)	5 (1%)	29 (4%)
Asian	17 (33%)	28 (20%)	118 (39%)	281 (41%)	280 (39%)
Filipinx	0	0	12 (4%)	38 (6%)	40 (6%)
Latinx	99 (18%)	34 (24%)	78 (26%)	205 (30%)	222 (31%)
Native American	N/A	N/A	N/A	N/A	N/A
Pacific Islander	N/A	N/A	N/A	N/A	N/A
White	24 (47%)	80 (56%)	80 (26%)	118 (17%)	106 (15%)
Decline to State	N/A	N/A	N/A	N/A	N/A

4. What do you observe in the data above? What do you want the college to understand about enrollment by ethnicity in your program?

The table above shows the ethnic breakdown of course enrollment over the years of students taking part in SLI programs (same total 85 students mentioned above in the gender table).

From the data table, I notice that we have a healthy proportion of Latinx students and that our student of color populations exceed White students. When compared with the general population of Foothill students taking STEM courses, we see that SLI programs serve more Latinx, Filipinx, and Black students proportionally and fewer White students. SLI's target population is students from underrepresented groups in STEM, and we see that bear out with the lower proportion of White students. Asian students are not necessarily underrepresented in STEM (especially East Asian and South Asian students) - however, we make an effort to also take income and first generation college going background into consideration when targeting Asian students.

We know the Black population is much smaller at Foothill, but we aim to reach more Black STEM students to support their STEM pathways.

5. Action: What actions does your program plan to take in order to achieve your goals?

Based on the data, we know that students of color enter STEM in proportional numbers but do not persist through upper level courses. We also know that sense of belonging, extra supports, and experiential learning (i.e., internships) all make a difference to increasing retention in STEM. Therefore, we continue to put a large emphasis in our outreach on students from racially underrepresented groups in STEM - Black and Latinx students primarily. We will continue to look to work with programs such as Umoja and Puente to enable cross-programming for our students. We do mutual outreach and program staff in all three programs (Umoja, Puente, and SLI) know each other at a collegial level. With the launch of MESA, I hope to do more program collaboration with those two programs as well as EOPS since many of our students will be jointly enrolled in these programs.

6. Needs: What does your program need to execute this action plan?

The launch of MESA will be a slow process with the challenges of launching a new college-wide program with limited name recognition and making sure URM students hear about the program as well as the challenges of setting up the infrastructure for a new program. I hope to have opportunities to do college-wide outreach with staff and faculty to help promote the program to our students.

## G. Course Success by Student Demographics

### a. Course Success by Gender

	2017-18	2018-19	2019-20	2020-21	2021-22
Female	23 (96%)	86 (85%)	157 (90%)	390 (93%)	332 (85%)
Male	20 (74%)	38 (93%)	114 (93%)	230 (92%)	268 (85%)
Non-Binary	0	0	6 (100%)	15 (75%)	11 (85%)

7. What do you observe in the data above? What do you want the college to understand about course success by gender in your program?

The table above refers to the 85 SLI involved students from 2021-22 and their course success in STEM classes.

It is encouraging to see the high rates of course success for SLI-involved students. In fact, when compared to the general Foothill population of students taking STEM courses, the course success rates for SLI-involved students is considerably higher than the averages (which hover around the mid to upper 70% range over time - for all genders).

It is not possible to determine correlation between SLI program involvement and course success - but they are definitely interrelated which I hope the college can observe through this data.

8. Action: What actions does your program plan to take in order to achieve your goals?

Though it is encouraging to see these high course success rates, I would like to better understand if SLI is only attracting students who are high achievers already or if involvement also drives up course success rates at the individual level. I want SLI programs and resources to be available even for the students who are not achieving A+ averages but are also struggling and looking to improve their GPAs over time.

9. Needs: What does your program need to execute this action plan?

A more sophisticated grade tracking system might be helpful to implement to track student grades when they enter SLI programs and then over time until they leave Foothill. I am not sure if this kind of system might be feasible, especially as the numbers involved with SLI, such as through MESA, will increase over time, and this kind of micro-level of data collection may be unwieldy and unsustainable. I would want to meet with folks in IR to determine if we could track this over time.

## b. Course Success by Ethnicity

	2017-18	2018-19	2019-20	2020-21	2021-22
African American	0	0	2 (100%)	4 (80%)	27 (93%)
Asian	17 (100%)	28 (100%)	117 (99%)	275 (98%)	248 (89%)
Filipinx	0	0	7 (58%)	37 (97%)	36 (90%)
Latinx	9 (100%)	26 (76%)	73 (94%)	178 (87%)	171 (77%)
Native American	N/A	N/A	N/A	N/A	N/A
Pacific Islander	N/A	N/A	N/A	N/A	N/A
White	16 (67%)	70 (88%)	65 (81%)	105 (89%)	89 (84%)

[Decline to State](#)

10. What do you observe in the data above? What do you want the college to understand about course success by ethnicity in your program?

The table above refers to the 85 SLI involved students from 2021-22 and their course success in STEM classes.

Similar to the Course Success by Gender table, we see that SLI-involved student course success is higher for all race/ethnic groups when compared to the general Foothill population taking STEM courses - most percentages are about 10-15% higher for each race/ethnic group. Again, as with the gender table, it is hard to determine correlation but there does seem to be some kind of relationship between high course success and SLI program involvement that would warrant more investigation.

11. Action: What actions does your program plan to take in order to achieve your goals?

As with the previous table, I would like to better understand if SLI is only attracting students from different race/ ethnic groups who are high achievers already or if involvement also drives up course success rates at the individual level. I especially want to better understand the data for the Black and Latinx students to gain a better understanding of students' course success as it relates to SLI program interventions such as staff support, counseling, and peer tutoring which we offer.

12. Needs: What does your program need to execute this action plan?

As I noted in my previous response for the gender data, I think a more sophisticated grade tracking system might be helpful to implement to track student grades when they enter SLI programs and then over time until they leave Foothill. I would want to meet with folks in IR to determine if we could track this over time.

13. Use this opportunity to reflect on your discussions above and include any closing thoughts.

This is SLI's first time doing a program review, and I am excited to lay this groundwork for formalizing our work and setting some data foundations for evaluating and assessing our work for the future. We are in an exciting stage of growth with the new MESA funding and the prospects of hiring more staff to support the programs. Each year, SLI has grown and it is exciting to see the data to track our growth and impact over time. I welcome the opportunity to read my colleague's feedback to what has been laid out above. Thank you for your time!

(after reading committee responses) - I appreciate the feedback from the committee, and in the future I will add research citations to relevant places in my report (as they suggested).

This form is completed and ready for acceptance.