INNOVATEBIO
National Biotechnology Education Center

Envisioning the Next Bioscience Workforce:
A Summit on Industry Trends and Needs
Washington, DC
June 26-27, 2023

Pathways Mini-Panel

John Carrese, Moderator

Tuesday, June 27, 2023

11:45 AM -12:15 PM

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Pathways

Highlighting innovative pathway models that bring students into biotechnology programs.

- **Guy Hamilton**, **Ph.D.**, Executive Dean of Workforce and STEM, Shoreline Community College, Washington
- **Ted Szczawinski**, Assistant Superintendent for Curriculum, Passaic County Technical-Vocational Schools, New Jersey
- **Andria Denmon, Ph.D.**, Program Lead, Biotechnology, Associate Professor, Life Sciences; Cell Biology, Evolution, Genetics & Molecular Biology, Santa Monica College, California
- **Michael Fuller**, Pathways Lead and Program Manager, Bay Area Biotechnology Education Community (BABEC), California

Shoreline CC - Essentials of Biomanufacturing Dual Credit High School Training program

- Course outcomes and assessment methods developed in partnership with High School CTE programs and Bristol Meyers Squibb, Seagen and AGC
- High school juniors recruited using extensive High School teacher network develop through Biotech outreach program
- Looking for students not necessarily interested in a 4-year STEM degree
- Students enroll via running start (dual credit) in one 3 credit Biomanufacturing Lab course per quarter – NO need to rearrange a full senior year schedule of classes

Shoreline CC - Essentials of Biomanufacturing High School Training program

- Courses held at the AGC Biologics Biomanufacturing training site.
- Industry Partners - Parse Bioscience, NovoNordisk, Fred Hutch, Nanostring, AGC Biologics provide:
  - Students matched with industry mentors for the length of the program
  - Guest lecturers and lab tours
- Students earn Basics of Biomanufacturing Certificate and credits towards the Biotech Lab Technician AAAS degree

Shoreline CC - Essentials of Biomanufacturing High School Training program – Fred Hutch

- High School students complete 2 paid internships at Fred Hutch
  - 1st internship between Junior and Senior year
  - 2nd internship between Senior year and 1st year at Shoreline
- Senior year, students enroll in running start courses to prepare for 1 year Biotech credential at Shoreline
- 1-year credential will articulate to the AAAS Biotech Lab Technician Degree

Shoreline CC - Essentials of Biomanufacturing High School Training program – Summary

- Develop relationships with aligned high school programs
- Design lower credit courses college course that function as an onramp to a credential or degree
- Engage with industry to design course outcomes and assessments
- Involve industry HR, College Foundation, Marketing and Outreach in process
- Program expansion – 8 students in 2021 cohort, 24 students in Fall 2023

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BIOTECH

Early College Option

Ted Szczawinski

Assistant Superintendent for Curriculum, Passaic County Technical-Vocational Schools, New Jersey

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The Vision

- In 2017, the 21 county vocational school districts in New Jersey were unable to meet the needs of 17,000 students who sought enrollment but could not be accepted due to a lack of facilities.
- On November 6, 2018, the voters approved a general obligation bond issuance for the Securing our Children's Future Initiative.
- Our unmet need for Life Sciences programs in 2019 was 800.
- We will be able to support 150-200 students per year, our first cohort will be 150.
- Dual enrollment funding will utilize a combination of local district funds and grants received through the community college

The Bond

- The Securing Our Children's Future Bond Act funds Career and Technical Education (CTE) expansion projects at county vocational school districts (CVSD) and county colleges in New Jersey.
- Offering one or more of the following; High School Diploma and College Associate Degree, Pre-apprenticeship and Industry Credential attainment for students in high-skilled, high wage, high-demand career pathways.
- Strengthening the relationship between PCTVS & PCCC by connecting both institutions.

Project Funding

- Seventy-Five - percent (75%) of the project's $25 million-dollar cost is funded by the State of New Jersey from the bond legislation funding.
- Twenty-Five - percent (25%) of the project's cost will be provided through a County bond issued by our Passaic County Commissioners.

PROJECT COLLABORATORS

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Grade 9: Freshman	PCCC Course	Associate Credits Earned
Biotech CTE Level I (100 Minutes): Intro to Biotech / Laboratory Operations / IVC (CASE Curriculum)		
English I		
Algebra I or Geometry		
Biology / (PA) Biology I & II*	Biology I & II*	8
World Language I		
World History		
Physical Education/Health		

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Grade 10: Sophomore	PCCC Course	Associate Credits Earned
Biotech CTE Level II (100 Minutes): Selected Topics in Science, Intro to Supply Chain Mgmt/ Certified Production Technician (NJMEP Pre-Apprenticeship	Selected Topics in Science	3
English II		
Algebra II / Geometry		
Chemistry / Chemistry I & II*	Chemistry I & II*	8
World Language II		
Physical Education		
Intro to Psychology/ Sociology	Intro to Psychology/ Sociology	3

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Grade 11: Junior	PCCC Course	Associate Credits Earned
Biotech CTE Level III (100 Minutes): Applications of Biotech - Cell, Micro & Genetics*	Cell, Micro & Genetics*	12
English III*	COMP I*	3
Algebra II/ Calculus*/ Business Calc* /AP Calculus AB/BC	Calculus*	4
Elective		
U.S. History I & II / (PA) History I & II*	History I & II*	6
Physical Education/Health		
College Learning Strategies*	College Success*	2

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Grade 12: Senior	PCCC Course	Associate Credits Earned
Biotech CTE Level IV (140 Minutes): Organic Chemistry I & II* for Biotechnology	Organic Chemistry I & II*	8
English IV / COMP II*	COMP II*	3
Elective		
Elective		
Elective		
Physical Education/Health		
		60

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Creating an Equity-Centered Biotechnology Program: From Concept to Action

Andria P. Denmon, PhD., Santa Monica Community College

Actualizing Equity

“Equality is leaving the door open for anyone who has the means to approach it; equity is ensuring there is a pathway to that door for those who need it.”

–Caroline Belden

Know Who You Plan to Serve

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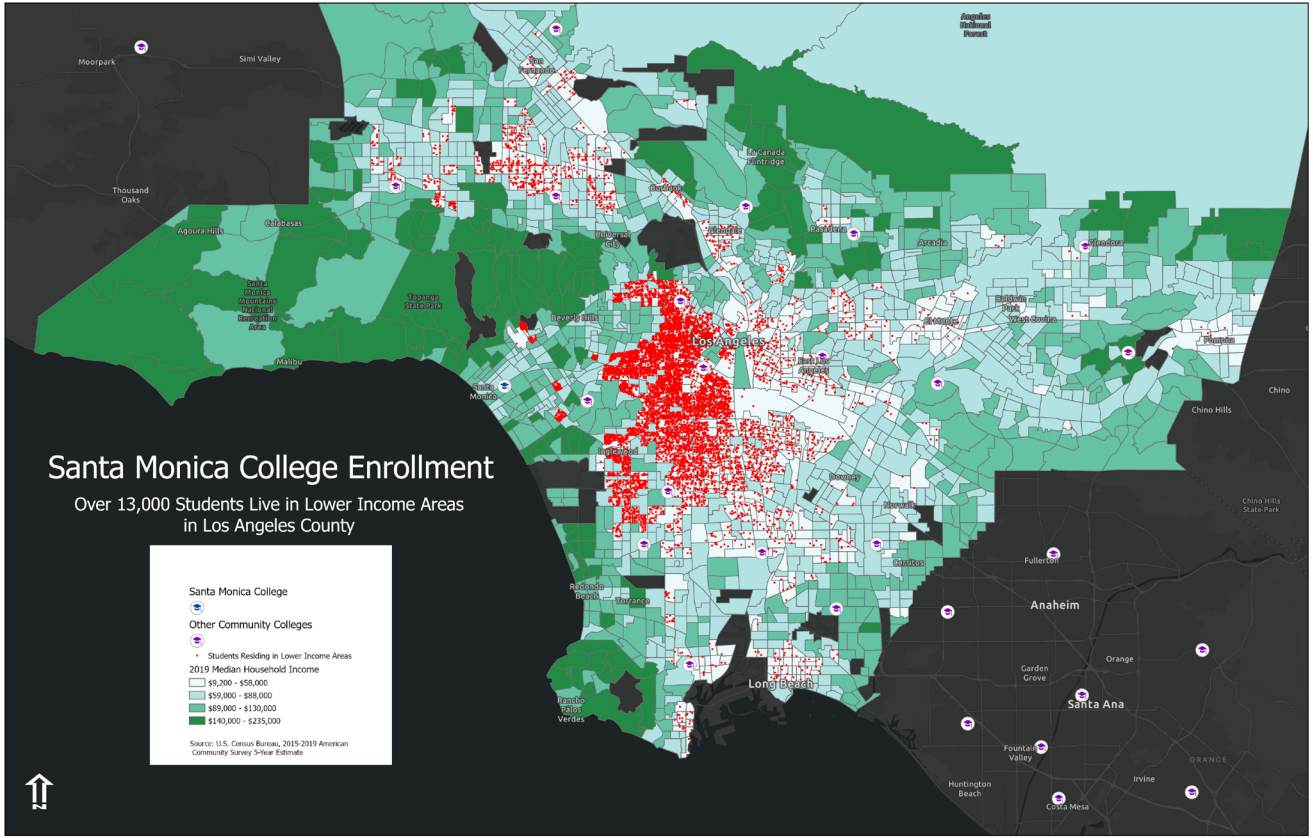

Learn What Students Need

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Develop relationships built on trust

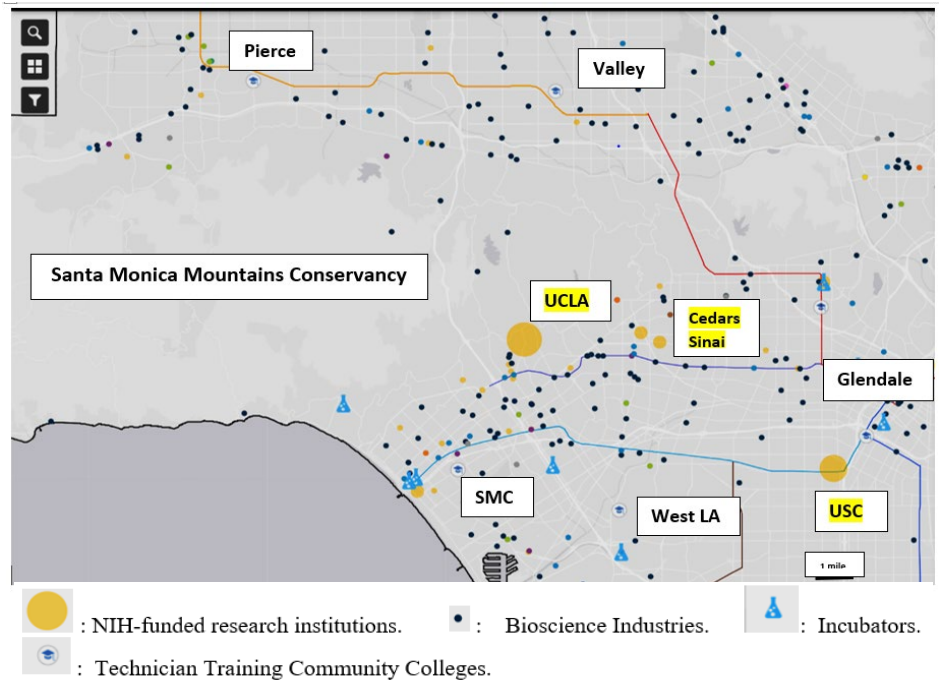
Create safe spaces for focus groups

Follow up with surveys

Provide updates on the outcomes generated by student input

Know Your Industry Partners

- Identify partners within your student service radius
- Work with HR
- Understand the impact of paid internships on student financial aid
- Discuss eligibility for DACA and system impacted students
- Advocate for accessibility



Thank You!

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Strategies for recruiting High School students to Community College Biotechnology Programs

Michael Fuller
Pathways Lead & Program Manager
Bay Area Bioscience Education Community (BABEC)

Biotechnology Instructor, Skyline College

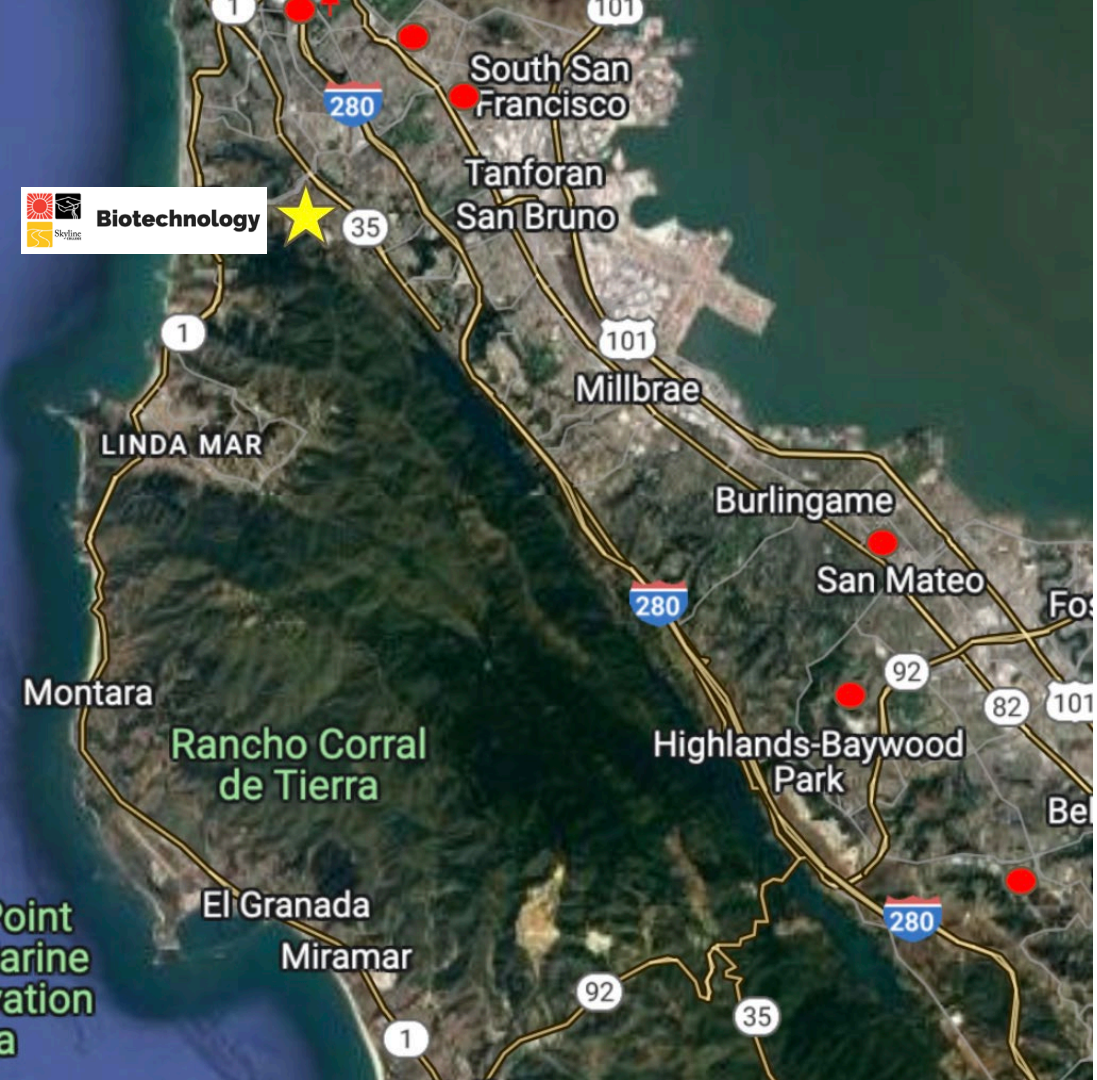
High School Recruitment Goals

- **Increase the # of Dual Enrollment Biotech students matriculating from partner high schools by 50%**

- **Increase the # of Underrepresented Minority (URM)* students enrolled in Biotechnology courses at Skyline by 25%**

***UCSF Office of Diversity and Outreach** "…racial or ethnic makeup is one of the following: African American/Black. Asian: Filipino, Hmong, or Vietnamese only. Hispanic / Latinx."*

Biotechnology



Participating High Schools with Dual/Enrollment Biotechnology

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- -Gateway HS*
- -El Camino HS*
- -South San Francisco HS*
- -San Mateo HS
- -Carlmont HS
- -Aragon HS

***Recruitment focus on 3 schools closest in proximity, Title I and/or URM population**

Editable Tube Graphic

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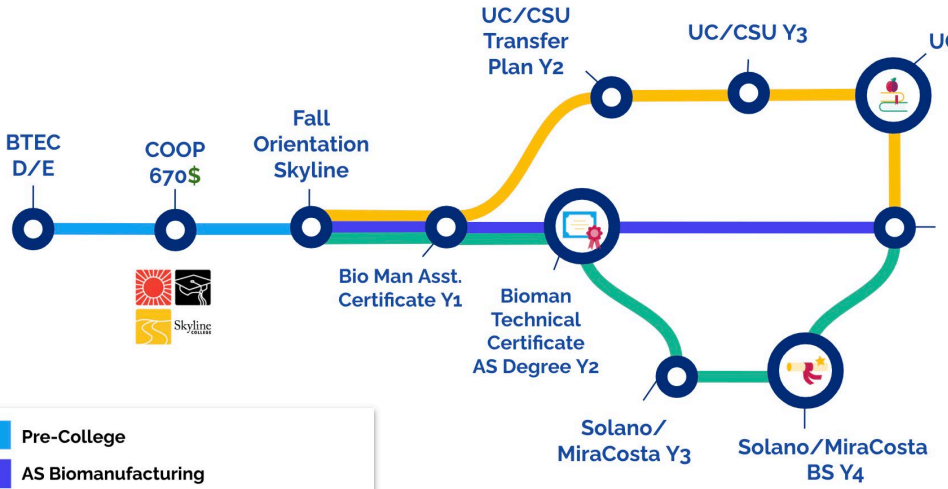
Skyline COLLEGE **Biotechnology**

BABEC BAY AREA BIOSCIENCE EDUCATION COMMUNITY



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First year semester schedule samples

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Biotechnology

- Pre-College
- AS Biomanufacturing
- BS Biomanufacturing Solano/MiraCosta
- UC/CSU transfer for BS

Sample Semester 1 Schedule

Course Name	Units
BTEC 400- Foundations of Biotechnology	2
ENGL 100- Composition	3
COUN 100- College Success	3
CHEM 210- General Chem I	5

Sample Semester 2 Schedule

Course Name	Units
BTEC 170- Principles of Applied Biosciences	3
BTEC 171- Lab Principles of Applied Biosciences	1
Math 200- Elementary Probability & Statistics	3
BIOL 215- Organismal Biology: Core I	5

Summer Biotech COOP 670 Enrollment

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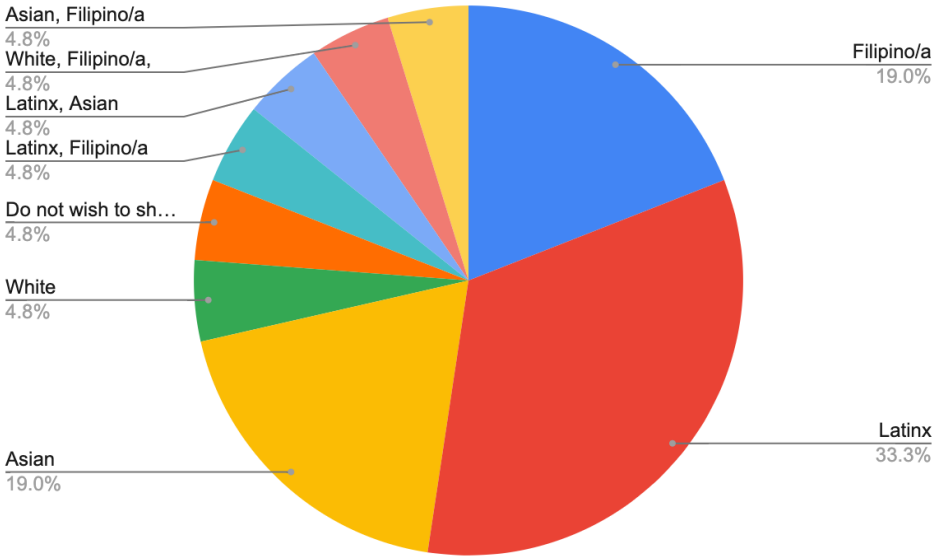
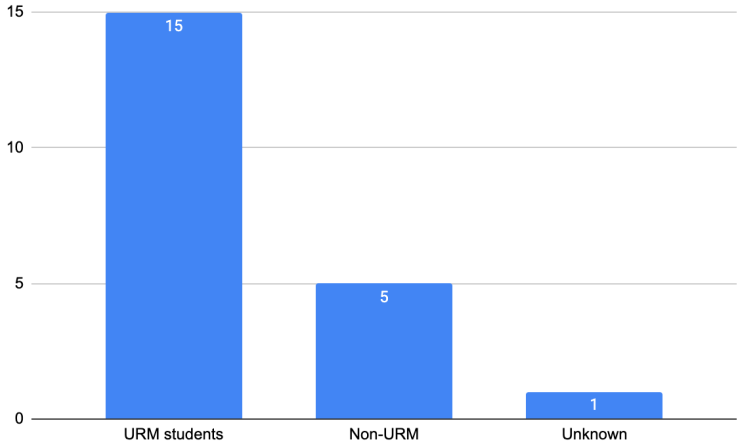
Self Identified Ethnicity (n=21)



URM Population (n=21)



Suggested Recruitment Strategies

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Provide choice to students & families. Transferring to earn a 4 year degree should be included in addition to Certifications and AS degrees. SHOW them what this might look like.

Seek out multiple touch points with students throughout high school. One time events (fairs, career days) are a start but try to pair with direct outreach in classrooms---doing hands on labs can help.

Internships, apprenticeships, are greatly discussed topics across ATE disciplines right now. Paying students to participate in a field that many are unfamiliar with (or may not feel welcome), can bring immediate value to career options like biotechnology.

Audience Questions for the Panelists (4 min.)

Questions for State Teams to Discuss (10 min.)

1. Is there a similar unmet need in your state?
2. What resonated for you in the mini-panel presentation?
3. How can you bolster/develop new pathway programs in your state to bring more students into biotechnology programs?