

# A Collaborative Approach to Work-Based Learning: Building More Inclusive Lab Environments



DUE 2055735 and 2055309

## Evaluation Report

Year 2: July 1, 2022-March 31, 2023

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## LIST OF ACRONYMS

ATE	Advanced Technological Education
DUE	Division of Undergraduate Education
CCSF	City College of San Francisco
IMT	Inclusive Mentor Manager Training – for Biotech Supervisors and Research Mentors
WNT	Workplace Navigation Training – for Community College Biotech Students
STEM	Science, Technology, Engineering, and Mathematics
UCSF	University of California San Francisco

## EXECUTIVE SUMMARY

In July of 2021, NSF awarded a three-year grant to support the project titled “A Collaborative Approach to Work-Based Learning: Building More Inclusive Lab Environments.” The purpose of this grant is to build upon the successful model of professional development created in support of the biotechnology work-based learning project developed through a collaboration between City College of San Francisco (CCSF) and the Office of Career and Professional Development at the University of California San Francisco (UCSF). The previous work resulted in the development of two training programs:

- The Workplace Navigation Training (WNT) supported CCSF bioscience student interns with knowledge, tools, and skills designed to help them more successfully navigate the biotech workplace in an academic research laboratory.
- The Inclusive Mentor-Manager Training (IMT) trained academic research mentors with the knowledge, tools and practices that foster inclusion in the workplace.

The first goal of this grant is to revise the Workplace Navigation Training (WNT) curriculum to be used to support community college students in internships in industry as well as academic settings and then to disseminate the curriculum to community college programs beyond CCSF. A second, goal is to revise the Inclusive Mentor-Manager Training (IMT) curriculum for relevance in both academic and industry contexts and to disseminate it to industry contexts and academic settings beyond UCSF. A third goal of this project is to expand the Inclusive Workplace Training (IWT) Program to include internships in industry settings as well as UCSF.

Work in the second year focused on the project’s second objective: Create and disseminate the Inclusive Mentor-Manager Training for biotech industry managers and academic mentors. While the team continued work on all goals of the grant, this evaluation focused on the second goal. The purpose of the evaluation was to determine 1) to what extent the project succeeded in disseminating the program beyond UCSF to include participants from industry and other academic settings, 2) did the team successfully revise the curriculum to be relevant for participants from industry and academic settings such as UCSF and beyond; and 3) in what ways did participating in the IMT program impact participants’ thinking, behaviors, and organizations? To do so, the evaluator analyzed data collected through participant surveys and one-on-one interviews conducted several months after the workshops were held.

The results of the evaluation suggest that the project was successful in achieving all its goals regarding the IMT program. The workshops were attended by 328 individuals representing 54 industry companies, and 44 academic institutions including UCSF. From the surveys completed over the course of the Spring IMT workshop, 99% of respondents strongly agreed or agreed that the content was relevant, 98% had or intended to implement a tool or strategy learned, and 98% felt that there was a need for this training in their organizations.

The impact of the training was evaluated using quantitative data from the surveys and enriched with an analysis of the qualitative data gathered. When asked about specific tools between 63% and 89% of Spring 2022 IMT respondents reported that one or more specific tools had impacted their thinking. Ninety-three percent of Fall 2022 IMT respondents reported that the training had impacted their thinking. The impact on behaviors ranged from 37% to 67% as reported by Spring 2022 IMT respondents regarding specific tools and 43% of Fall 2022 IMT respondents reported that the training had resulted in changing their behaviors. These data, though based on a small population of data, suggest that the project was quite successful on these parameters.

After analyzing the qualitative data, the conclusion is that the training succeeded in impacting participants’ thinking and behavior and had organizational impacts for some of the participants. Briefly stated, data showed that the project impacted participants in the following ways:

**1. Impacting How Participants Think**

- It changed how they perceive and think about differences in work styles.
- It changed how they think about their role as a supervisor.
- It changed how they think about addressing supervision - realizing there are frameworks and tools that can help them address responsibilities systematically, effectively, and inclusively.

**2. Impacting How Participants Behave**

- They incorporated strategies to work effectively with rather than stigmatize/pathologize difference in others.
- They became better at setting clear expectations and developing training paths to meet the needs of more junior researchers and using feedback more confidently to invest in a mentee's growth.
- They were inspired and empowered to enact leadership within their organization's efforts to become more inclusive because they have concrete tools to offer.

**3. Impacting Organizations**

- It motivated the development of more inclusive hiring practices within the organization.
- It resulted in an IMT-based training for a large group of managers to build the capacity for organizational change.

In conclusion, the results described in this evaluation provide ample evidence that participation in IMT leads to impacts that include changing individual perceptions of the role that research mentors play in fostering inclusion, and that in many cases the heightened awareness, knowledge, skills, and tools they learned have changed the way they engage as mentors and colleagues. Still more importantly, perhaps, evidence suggests that the value of this training for participants leads to sharing information and ideas with others and therefore this training has the potential to be instrumental in changing culture, processes, and systems within participants' organizations. In thinking about how the program can support participants and organizations in adopting and implementing the ideals and tools shared in the IMT program, one step to consider would be to encourage members of organizations to attend the training as part of a larger cohorts encouraging them to make meaning of their learning together and work together to find ways to implement what they have learned in the context of their own organizations.

## INTRODUCTION AND CONTEXT

### THE CHALLENGE OF DIVERSITY, EQUITY, AND INCLUSION IN BIOTECHNOLOGY

The work of this current NSF funded project, DUE 2055735 and 2055309, continues an equity project begun at City College of San Francisco (CCSF) in the early 2000s and continued with the support of their most recent NSF/ATE Grant, “A Collaborative Approach to Work-Based Learning: Addressing the Needs of Community College Biotechnology Students and Their Research University Mentors,” (NSF DUE 1801186, 2018-21).

After having institutionalized a work-based learning program designed to strengthen the biotechnology pipeline for community college students, a small team from CCSF focused their attention on addressing the biases, norms, and practices that result in persistent systemic barriers for many in STEM programs and workplaces. Teaming with the Office of Career and Professional Development at the University of California San Francisco, they submitted and were awarded an NSF ATE grant, “A Collaborative Approach to Work-Based Learning: Addressing the Needs of Community College Biotechnology Students and Their Research University Mentors,” (NSF DUE 1801186, 2018-21), allowing them to develop a new kind of training model in which research mentors were trained and coached in inclusive mentoring and their community college interns were simultaneously trained in skills designed to help them more successfully navigate the biotech workplace.

As a case study, “A Collaborative Approach to Work-Based Learning: Addressing the Needs of Community College Biotechnology Students and Their Research University Mentors” provided data suggesting the promise of their program. Mentors gained a more critical awareness of their role in the internship experience and tools to help them create a more inclusive training experience. Interns showed an increase in both their sense of belonging in the bioscience field and self-efficacy as scientists and learned skills to help them identify and seek out the support they needed to be successful. The team of Principal Investigators were interested in finding ways to disseminate the trainings beyond UCSF and CCSF and to create a course that would be relevant in biotechnology industry settings as well as academic settings. This is the goal of the current grant.

Adapting and disseminating innovative programs and practices that have been effective in one context into new contexts poses a variety of persistent challenges in bringing innovations to scale while maintaining their integrity. Still, the team is taking on this challenge and attempting to understand how the previous work can be revised and translated from their specific program to other academic training settings and the biotech industry. The goals of this grant are three-fold: 1) to develop workplace navigation trainings (WNT) that will support community college students and trained technicians navigate the industry workplace, 2) to develop trainings for industry research supervisors in inclusive managing and mentoring (IMT), and 3) to expand the IWT program beyond UCSF to include internships in industry settings. Table 1 displays the project objectives.

Table 1. DUE 2055735 and 2055309 Project Objectives and Timeline of Activities	
Project Objective	Project Activities
<b>Objective 1 – Create and disseminate a Workplace Navigation Training for CC students.</b>	<p><b>Year 1</b></p> <p>Activity 1A. Conduct needs assessment for Workplace Navigation Training for CC students</p> <p><b>Years 2 &amp; 3</b></p> <p>Activity 1B. Develop, pilot, and disseminate Workplace Navigation Training for CC students</p>
<b>Objective 2 – Create and disseminate the Inclusive Mentor-Manager Training for biotech industry managers and academic mentors.</b>	<p><b>Year 1</b></p> <p>Activity 2A. Conduct needs assessment for the Inclusive Mentor-Manager Training for biotechnology industry managers and academic researchers.</p> <p><b>Years 2 &amp; 3</b></p> <p>Activity 2B. Develop, pilot, and disseminate Inclusive Mentor-Manager Training for biotechnology industry and academia.</p>
<b>Objective 3 – Refine and expand inclusive Work-Based Learning experiences for CC biotechnology students.</b>	<p><b>Years 2 &amp; 3</b></p> <p>Activity 3A. Refine and disseminate the Inclusive Workplace Training program.</p> <p>Activity 3B. Expand the Inclusive Workplace Training Program with industry mentors</p>

This evaluation focused on the second objective: the dissemination of the Inclusive Mentor Manager Training (IMT) beyond UCSF into other academic and industry settings. During the first year of the grant, the team conducted a needs assessment process to identify areas for content revision and consider issues important to the program model and implementation. From these efforts, the team developed a revised program format consisting of a series of online modules offered over the course of one month. The revised program, Inclusive Mentor Manager Training 10, was offered in May to early June 2022. Spring 2022 IMT, presented two times per week in 90 min interactive virtual modules over the course of the month, consisted of the following seven modules:

- Module 1 Are you ready to be an inclusive research mentor/manager? How good people unintentionally build inequitable work environments
- Module 2 Effectively supervising people who aren't you: Managing different work styles
- Module 3 How to transparently set (performance and conduct) expectations
- Module 4 Teach/train and delegate: Using best practices to train your diverse team
- Module 5 Communicating inclusively: developing your own feedback strategy and style
- Module 6 When someone isn't meeting your expectations: Strategies and resources to manage performance equitably
- Module 7 How to inclusively hire: Which strategies will you use?

Feedback from this first workshop series led the team to revise the curriculum into eight rather than seven modules. So Fall 2022 IMT, offered in late October to November, twice per week in 90 min interactive virtual modules over the course of the month consisted of the following:

- Module 1 Assess Yourself: How inclusive are you at work/in the lab?
- Module 2 Assess Yourself: How ready are you to manage your mentee/employee's productivity?
- Module 3 Effectively supervising people who aren't you: Managing different workstyles
- Module 4 How to transparently set (performance and conduct) expectations
- Module 5 Teach/train and delegate: Using best practices to train your diverse team
- Module 6 Communicating inclusively: developing your own feedback strategy and style
- Module 7 When someone isn't meeting your expectations: Strategies and resources to manage performance equitably
- Module 8 How to inclusively hire: Which strategies will you use?



## EVALUATION METHODS

### PURPOSE AND INTENDED USE

This evaluation examines the grant activities during the second year, between May 1, 2022 to March 31, 2023 in order to assess the dissemination efforts of the Inclusive Mentor Manager Training. The intended audience for this report is the project’s leadership team for the purposes of ensuring that they are on course and to inform the work in the subsequent years of the grant.

### QUESTIONS AND DATA COLLECTION METHODS

Evaluation activities during the second year were designed to determine how effective revision and dissemination efforts were and to describe the impacts of the IMT workshop series. Table 2 shows the questions that guided the evaluation and the data sources associated with each method.

Table 2. Evaluation Questions Guiding the First Year Evaluation and Sources of Data	
<b>Objective 2:</b> Create and disseminate the Inclusive Mentor-Manager Training for biotech industry managers and bioscience academic mentors.	
Evaluation Question	Data Sources
1. What was the extent of dissemination for the IMT trainings?	Registration and Participation Data
2. Do industry participants find the training relevant?	Post-workshop surveys (formative & summative) Participant interviews
3. In what ways has participating in the workshops impacted participants in their: <ul style="list-style-type: none"> <li>• Thinking?</li> <li>• Behaviors?</li> <li>• Organizations?</li> </ul>	One-on-one interviews

The evaluation was conducted in two phases. It began with examining the administrative data collected by the project team throughout the workshop series, and the surveys administered after the workshops. The team asked participants to provide feedback after each workshop to provide formative assessment of the program. The response rate for those surveys was quite high, with industry participants responding at higher rates than participants from academia see Table 3).

Table 3. Response Rates for IMT Module Surveys (Formative)							
	<u>Module 1</u>	<u>Module 2</u>	<u>Module 3</u>	<u>Module 4</u>	<u>Module 5</u>	<u>Module 6</u>	<u>Module 7</u>
	% Response	% Response	% Response	% Response	% Response	% Response	% Response
Industry	55%	50%	60%	59%	61%	44%	44%
Academia	49%	42%	41%	43%	38%	32%	28%

Source: IMT10 Modules Survey Data - Spring 2022

After completion of each series, the team administered a final survey. Except to examine the relevance of the training, this evaluation focused more on the final survey data which attempted to measure the impact of the trainings (see Appendices A-C for the text of the surveys). It is not surprising that the final surveys for IMT had a lower response rate overall, given they were administered about a month after the completion of the survey. However, the response rate for the final survey for Fall 2022 IMT was particularly low, at about 17% (see Table 4).

Table 4. Response Rates for the Final Surveys for both Spring 2022 IMT and Fall 2022 IMT		
	<u>Industry</u>	<u>Academia</u>
	% Response	% Response
Spring 2022 IMT	64%	26%
Fall 2022 IMT	18%	15%

Source: IMT10 Modules Survey Data - Spring 2022; IMT11 Final Survey - December 2022

After examining the quantitative and qualitative data from the surveys, it was decided that the project would benefit from collecting richer data about the program’s impact. The team decided to expand the evaluation to include interviews with a small group of volunteers to better understand how the impacts were manifested. The evaluator reached out to those participants from Fall 2022 IMT who had indicated a willingness to be interviewed and then reached out to others from Spring 2022 IMT. Ten participants representing the biotech industry, non-UCSF academic institutions, and UCSF were selected for interviewing from a larger group of participants who indicated a willingness to participate in the evaluation (see Appendix D for information regarding interview participants). One-on-one interviews were conducted via Zoom by the evaluator during February and March 2023. The interviews were transcribed for analysis.

## EVALUATION RESULTS

This course opened my eyes to inclusivity in hiring, managing, interviewing, and daily interactions at work in areas that may have been blind spots for me. We've been given tangible tools to use in conversations with our co-workers and management to bring more openness and understanding of each other in the workplace.

- Industry Professional

### 1: WHAT WAS THE EXTENT OF DISSEMINATION BEYOND UCSF FOR THE IMT TRAININGS?

The Principal Investigators utilized a variety of networks in the recruitment of participants for the IMT trainings. Participants reported learning about the workshops from a variety of sources including direct emails from department heads and colleagues, professional Slack groups, conferences, and industry resources. In particular, the recruitment of industry participants was greatly aided by the team's collaboration with California Life Sciences and perhaps suggests the importance of collaborating with trade organizations in adding legitimacy to this work. As has been demonstrated throughout the work of this team, the long history in the biotechnology community, the ATE community, and the academic community has enabled the team to attract a broad representation within the first year and a half of this grant.

In both Spring 2022 and Fall 2022 trainings, most participants represented academic institutions but there was also a strong representation from industry. Table 5 displays the participation data for industry and academia for the Spring 2022 IMT and Fall 2022 IMT trainings. Combined, 449 individuals registered to participate in the two trainings. In all, 328 individuals representing 98 companies and academic institutions (including UCSF) attended the two-workshop series. For industry alone, 104 individuals from 54 different companies attended Spring 2022 IMT or Fall 2022 IMT. The dissemination to academic institutions beyond UCSF was similarly broad and included community colleges, colleges, and universities across the country, and governmental organizations. A more detailed presentation of the participant data can be found in Appendix E.

Table 5. Representation of Industry and Academia in Spring 2022 IMT and Fall 2022 IMT					
		Individual Organizations	Individual Organizations	Individual Participants	Individual Participants
		Registered	Attended**	Registered	Attended
Spring 2022 IMT-10	Industry	28	21	67	54
	Academia*	29	22	144	125
	totals	57	43	211	179
179 individuals representing 43 industry and academic institutions participated in IMT-10.					
		Individual Organizations	Individual Organizations	Individual Participants	Individual Participants
		Registered	Attended	Registered	Attended
Fall 2022 IMT-11	Industry	55	33	80	50
	Academia*	29	22	158	99
	totals	84	55	238	149
149 individuals representing 55 industry and academic institutions participated in IMT-11.					

\* Includes UCSF

\*\* Participants attended one or more of the workshop modules in the series.

Source: IMT Participant Stats

Participants reported learning about the workshops from a variety of sources including direct emails from department heads and colleagues, professional Slack groups, conferences, and industry resources. As has been demonstrated throughout the work of this team, the long history in the biotechnology community, the ATE

community, and the academic community has enabled the team to attract a broad representation within the first year and a half of this grant.

## 2. DO INDUSTRY PARTICIPANTS FIND THE TRAINING RELEVANT?

The first offering of the revised IMT curriculum occurred in May 2022. After each module, participants were surveyed to allow for feedback regarding content and delivery preferences. For each of the seven modules of Spring 2022 IMT, participants were asked to what extent they agree with the following statements (strongly agree, agree, neutral, disagree, strongly disagree):

- a. The workshop was a good use of my time.
- b. The workshop content is relevant to me.
- c. This workshop prepared me to better mentor-manager.
- d. This workshop prepared me to better mentor-manage diverse trainees.
- e. I will implement at least one tool or strategy from today's workshop
- f. The content and examples in the workshop were applicable to my organization.
- g. There is a need for this type of training at my organization.
- h. My organization would be receptive to implement the training covered in today's workshop.

All but the final question can be interpreted as a measure of relevance. The first analysis examined the responses to each question by combining the responses from each module. Table 6 displays the result of this analysis. The responses strongly skewed to strongly agree with a minimum of 2/3 of respondents selecting strongly agreed across each of the eight statements.

Table 6. Ratings of Spring 2022 IMT Participants on the Relevance and Value of the Workshop								
	a.	b.	c.	d.	e.	f.	g.	h.
Strongly Agree	80%	77%	75%	73%	63%	77%	84%	65%
Agree	20%	22%	24%	25%	28%	22%	14%	24%
Neutral	0%	1%	2%	2%	8%	1%	2%	9%
Disagree	0%	0%	0%	0%	0%	0%	0%	2%
Strongly Disagree	0%	0%	0%	0%	0%	0%	0%	0%

Source: IMT10 Modules Survey Data - Spring 2022

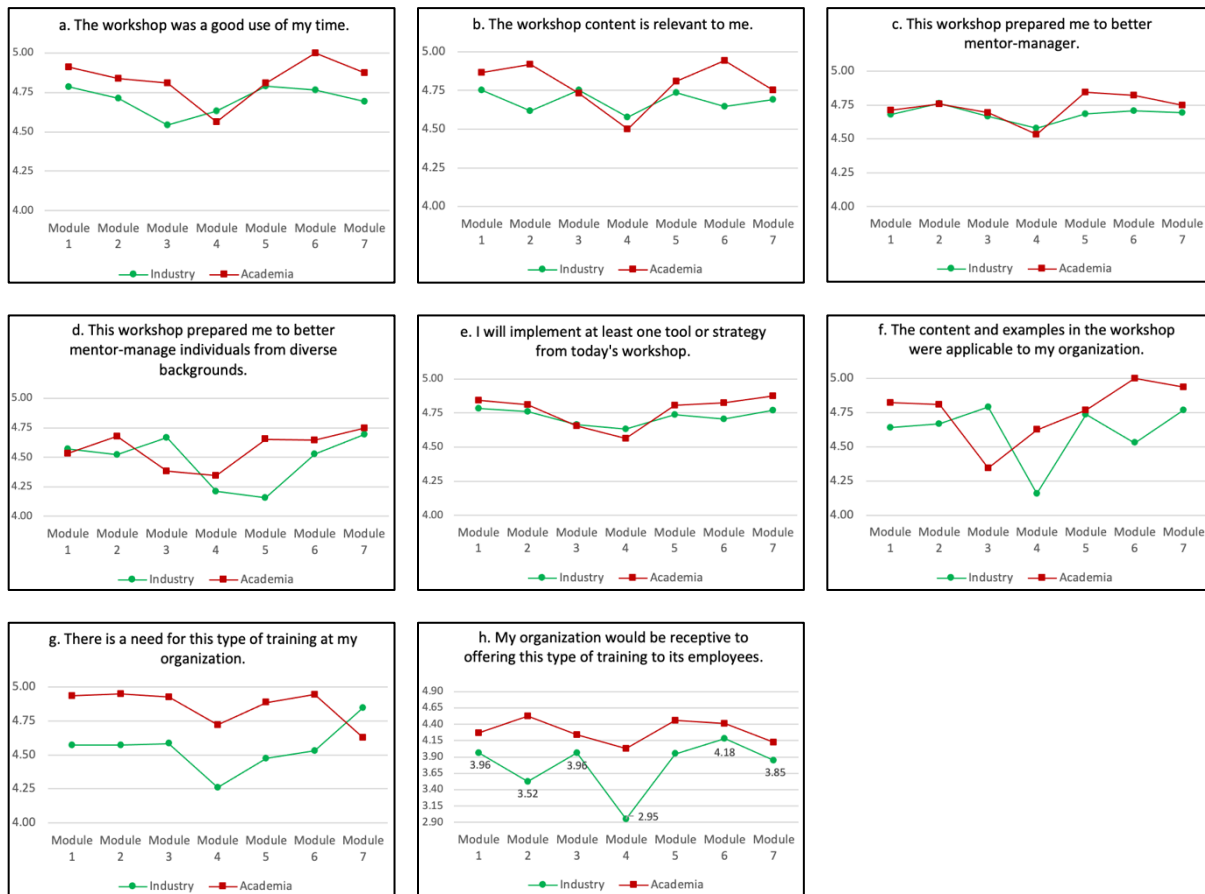
Because a key question for the team is whether the IMT had been successfully revised to be relevant to the industry context, the analysis presented compares responses from industry participants to those from the academic sector. Figure 1 a-h show that the responses were overwhelmingly positive to each of these questions by participants from both sectors, that is, for all but the final question, the average response for both sectors fell between 4.0 and 5.0 meaning that every response was either Agree or Strongly Agree.<sup>1</sup>

While these data suggest there may be some substantive difference in the way that participants from industry and academia experienced the workshop, there is not enough data to draw conclusions. Continued monitoring of future sessions will be needed to determine if more needs to be done to revise the content in a substantive way to be even more relevant.

It is worth noting, however, that all participants responded positively that they had or planned to implement at least one tool or strategy from the workshops, suggesting that not only was the content relevant, but that the majority of respondents found the content in each module accessible and immediately useful (see Figure 1.e.). Further analysis of qualitative survey data (collected more than a month after the each of the final workshops) and interview data confirmed this finding and will be discussed later in the report.

<sup>1</sup> Note that because the data range was so small the scale of the y-axis has been set between 4.00 and 5.00 for all but the final question in which the scale spanned from 3.0 to 5.0.

Figure 1. Comparison of Average Responses by Industry and Academic Participants to Questions About Spring 2022 IMT Relevance and Impact



Note: Data points represent average response where 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree.  
 Source: Spring 2022 IMT Modules Survey Data

The overwhelmingly positive responses shown in the data above provides convincing support for the conclusion that the project team has been successful in developing an Inclusive Mentor Manager Training program that is relevant for participants from industry and academic biotechnology research settings.

### 3. IMPACT ON PARTICIPANTS IN THEIR THINKING, BEHAVIORS, AND ORGANIZATIONS

#### Overall Impacts

The work of this grant is to foster the development of biotechnology supervisors who will take on the work of inclusion. The team seeks to impact the way participants think about inclusion and the role they play as a supervisor, and seeks to impact their behaviors, perhaps enabling them to support the development of more inclusive workplaces. The final surveys for both Spring 2022 IMT and Fall 2022 IMT focused on impact rather than relevance and included questions to assess impact and asked participants directly whether the course or specific content impacted their thinking, their behaviors, and whether their participation had resulted in any changes in their organizations. In this section, the survey analysis is presented first and demonstrates that the IMT programs successfully impacted thinking, behaviors, and to some extent, organizational practices.

In the final survey for Spring 2022 IMT, participants were asked to consider the impact of each of the 20 focal supervisory tools shared throughout the workshop series. Table 7 presents the data. The impact of tools

on thinking ranged from 63% to 89% with eight tools listed as having impacted the thinking of at least 80% of the respondents. The impact on behaviors ranged from 37% to 67%. Changing behavior can be more difficult than changing attitudes so the lower percentages for changes in behavior are not surprising.

What is notable, however, is that 17 of the 20 tools were reported to have changed the behavior of 50% or more of the respondents. That each of the tools was shared by about 30% of respondents, signifies not only that they found the tools interesting or helpful for themselves, but that they considered them potentially useful for others.

Table 7. Final Spring 2022 IMT Survey Results: Impacts of Spring 2022 IMT Tools				
Module 1: Are you ready to be an inclusive research mentor/manager?	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Assess Yourself: 4 Benchmarks to be an Effective Mentor/Mgr/Leader	63%	63%	33%	8%
5 Strategies: Inclusivity is a Design Question	73%	63%	29%	6%
Inclusivity Check: Meetings	65%	59%	24%	12%
7 Responsibilities of a Supervisor	73%	67%	39%	6%
Module 2: Effectively supervising people who aren't you:	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Understanding Workstyle Preferences: How do you do your best work?	80%	69%	55%	0%
Module 3: How to transparently set (performance and conduct) expectations	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Setting Goals with Objectives & Key Results (OKRs)	65%	67%	35%	0%
Tell/Know Checklist	65%	56%	21%	13%
Inclusivity Check: Setting Expectations	78%	67%	33%	0%
Module 4: Teach/train and delegate: Using best practices to train your diverse team	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Building a Training Plan: Backward Design from Expectations	81%	65%	35%	0%
Inclusivity Check: Teaching & Training	84%	63%	21%	5%
Delegation: Blanchard's Model	74%	49%	28%	9%
Module 5: Communicating inclusively	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Renniger: 4 Steps to Feedback	79%	62%	36%	4%
5 Step Feedback Loop	83%	55%	33%	2%
Module 6: When someone isn't meeting your expectations:	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Assessing the Issue: Problem Identification	82%	57%	34%	2%
Progressive & Productive Responses to Expectation Challenges	84%	55%	23%	2%
Responding from All Your Roles	82%	55%	23%	4%
Building Your Mentor-Manager Circle of Support	68%	52%	23%	16%
Module 7: How to inclusively hire	It changed my thinking	It changed my behavior	I shared it with someone	Had no effect/don't remember
Building Your Hiring Rubric	89%	37%	34%	3%
Building Your Interview Questions	74%	55%	26%	8%
Inclusivity Check: Writing a Position Description	82%	42%	34%	5%

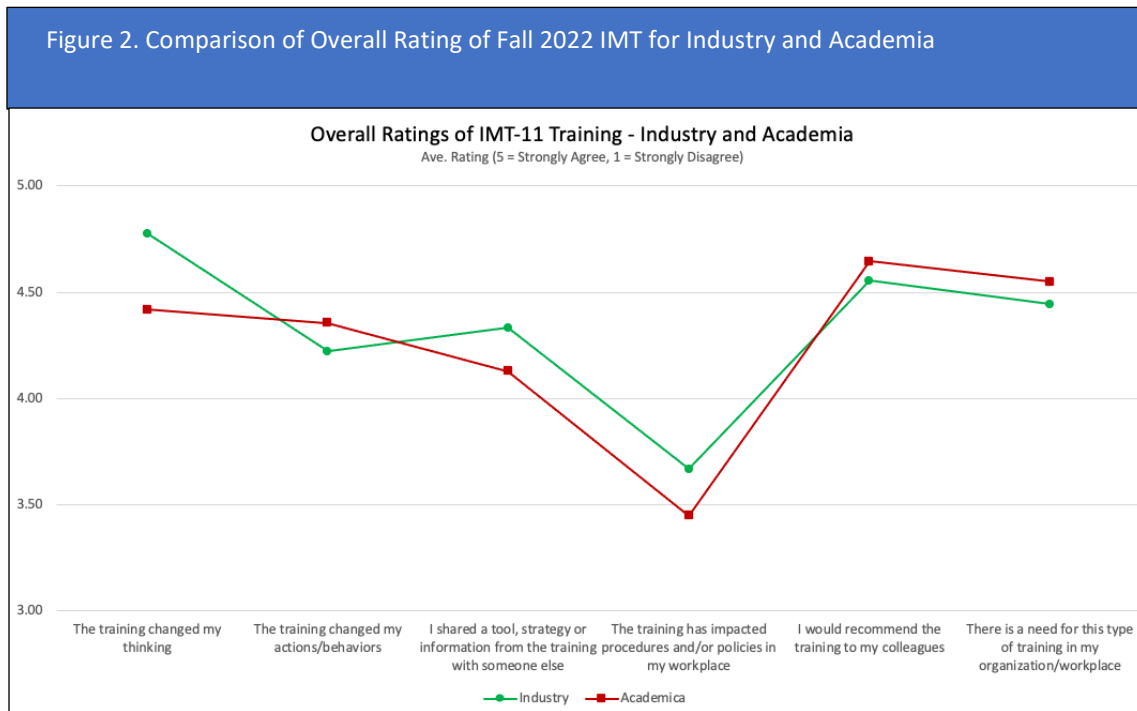
The summative survey for Fall 2022 IMT was revised to be more streamlined. Rather than ask about the impact of each supervisory tool individually, participants were asked to rate the impacts experienced from the training. Industry participants overwhelmingly reported that the training had impacted their thinking (58% strongly agreed), behaviors (including sharing the information with someone) and that they would recommend the training to colleagues (see Table 8).

Table 8. Reported Impact of and Need for Training - Fall 2022 IMT

	The training changed my thinking	The training changed my actions/behaviors	I shared a tool with someone	The training has impacted procedures in my workplace	I would recommend the training	There is a need for this type of training in my organization
Strongly agree	58%	38%	50%	10%	65%	58%
Agree	35%	5%	28%	33%	33%	38%
Neutral	8%	58%	13%	48%	3%	5%
Disagree	0%	0%	10%	5%	0%	0%

To compare responses from participants in industry and academia, the responses were also analyzed by converting responses to a Likert-like scale and then taking the averages. Figure 2 displays the averaged responses to each question. Similar to the responses from the data shown in Figure 1.a-h., the responses from both sectors tracked closely and were more neutral with respect to the impact on the organization than they were on personal impacts, suggesting perhaps that this is a reliable finding.

Figure 2. Comparison of Overall Rating of Fall 2022 IMT for Industry and Academia



Note: Data points represent average response where 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree. Source: Fall 2022 IMT (IMT-11) Final Survey - December 2022

In conclusion, the data shown above and comments written in the post-workshop surveys as well as examples provided during interviews demonstrate that the IMT series had a strong impact on: 1) participants' thinking and ideas around inclusive mentoring and managing, 2) that the tools and language provided to create structure supporting sometimes complex ideas, and 3) the easy access to the course materials after the workshops supported participants in implementing the ideas and practices in their work and their lives. In



some cases, participants reported their participation in the workshops has already led to broader changes in departments and in their organizations.

### **Describing the Impacts on Thinking, Behavior, and Organizations**

This section provides analysis of the qualitative data, primarily from the interviews but also from the comments shared in the surveys. I begin by sharing the impacts participants reported on their thinking, followed by impacts on behavior, and ending with impacts on the organizations in which participants belong. This section will show that attending the workshops impacted the participants in the following ways:

#### **1. Impacting How Participants Think**

- It changed how they perceive and think about differences in work styles.
- It changed how they think about their role as a supervisor.
- It changed how they think about addressing supervision - realizing there are frameworks and tools that can help them address responsibilities systematically, effectively, and inclusively.

#### **2. Impacting How Participants Behave**

- They incorporated strategies to work effectively with rather than stigmatize/pathologize difference in others.
- They became better at setting clear expectations and developing training paths to meet the needs of more junior researchers and using feedback more confidently to invest in a mentee's growth.
- They were inspired and empowered to enact leadership within their organization's efforts to become more inclusive because they have concrete tools to offer.

#### **3. Impacting Organizations**

- Motivated the development of more inclusive hiring practices within the organization.
- Resulted in an IMT-based training for a large group of managers to build the capacity for organizational change.

This section serves to confirm the conclusions based on the quantitative data, that the project team successfully achieved their goals in impacting thinking, behaviors, and organizational policies and procedures.

### **Impacting How Participants Think**

The reality that we are wearing multiple hats - mentor, supervisor, coach - and switch between them even in a single meeting / conversation requires that we recognize and actively choose the role we inhabit at each moment.

- Industry professional

Three themes appeared frequently in comments: 1) awareness that a research mentor fulfills multiple roles (i.e., supervisor, mentor, trainer) with accompanying sets of responsibilities (e.g., setting expectations, providing feedback and guidance) created clarity about the sources of conflict and tension in their own past experiences and empowered them to work more effectively now; 2) realizing that people have different preferences in the way they work, learn, and communicate changed the way they perceived themselves as well as others; and 3) given a set of concrete tools to refer to improved their ability to perceive issues that need to be addressed and realize that there were steps to take to address them. Each theme—representing a straightforward idea in name if not in execution—once presented, were aha moments for many participants who reported that the impact of these insights was potentially immense.

### **Research Mentor as Mentor, Supervisor, Trainer**

Dividing up the role of an academic advisor (during PhD) into supervisor (personnel managing) vs. mentor (general/career advice) vs. teacher (training scientifically). I had never thought about how it was the professor's job to \*also\* manage personnel effectively, which has been completely absent from our lab, and has helped me better understand why I frequently felt so frustrated with them during my PhD (that I'm allowed to have a boss who actually manages lab members & myself effectively).

- Non-UCSF researcher

Many participants reported that learning about the different roles research mentors play and the associated pressures and responsibilities that are associated with each was very important. In coming to understand these multiple roles, participants reported understanding how success in the research lab is a “bi-directional” iterative process. The 7 Responsibilities of a Supervisor clarified and created a structure around a complex relationship that enabled participants to better identify sources of tension in their work environment. The course, with the different modules revolved around the responsibilities helped some see inclusive mentoring as an iterative process, not just a list of responsibilities but as “a sequence of moves and loops” that can improve not only inclusion but performance.

Presented with these responsibilities, many reported a change in perspective, that it is a manager's responsibility not only to make sure the work gets done well, but to also make sure their reports have the knowledge, tools, and support necessary to succeed. Several comments revealed the anxiety and tension that junior researchers feel—the fear of admitting they do not understand something and looking stupid, the fear of admitting mistakes, the fear of struggling—because it seems to indicate a failure of them as a person, someone who does not belong. The understanding that there is a role for their supervisors to play in supporting the success of junior researchers was profound. It brought to light the importance of understanding the position of power research mentors have and the way that power can be utilized to create a more inclusive workplace.

Many comments refer to the strength of the training in identifying challenges and opportunities as well as providing tools research mentors can use to address these issues more inclusively. Having clarity of the multiple roles of a research mentor also allows a manager to determine how best to respond to various issues. While a manager needs to provide the time and resources junior researchers need to succeed, they are also responsible for getting the work done. As one comment illustrates, this understanding has provided clarity for how they understand their role:

[By] separating mentoring/managing from becoming a therapist/problem solver for the employee, I [learned] that I can be supportive and understanding—have empathy—while also not being distracted by or feel necessary to solve or remove the challenges.

In conclusion, the workshops changed the way participants perceived the role of the research mentor, provided a variety of resources that helped them think about challenges and opportunities, and helped them understand that leadership and management is a process that incorporates a variety of strategies and tools that can be learned.

#### Workstyle Preferences – Working with People Who Aren't You

Many people reported that the module on workstyle preferences had an immediate impact on the way they perceived themselves and others. Learning what the different work and communication styles were but also why people might have these preferences led many participants to report feeling more empathy for others. From the comments, it seems that many participants have experienced the tendency to judge people negatively when their behavior and work style do not reflect their own. As one participant shared:

This feels very simplistic but realizing so clearly how humans pathologize preferences was such a big shift/realization that it really helped me understand the other frameworks around mentoring much better.

The work style preferences—not just knowing what different kinds there are, but some explanations for why people prefer them, gives [me] a little more understanding and empathy.

Upon reflection, many admitted to falling prey to that bias and were very appreciative that the training opened their eyes to these “blind spots” and helping them find ways to “work with [others who are different] without stigmatizing.” One industry professional elaborated with a realization that “pathologizing how people work minimizes their contribution and puts unnecessary focus on how they manage their work (even when managed well and outcomes are good).”

Others found that this concept was critical in helping them adjust their own management process. One participant who wrote, “Loved the ‘you need to tell someone how to have a successful relationship with you’ discussion,” saw this as an aha moment. Similarly, one experienced manager reflected that learning about work style preferences and how people feel organized resulted in an important realization for themselves:

[I] hadn't really thought much about balance and how is it that people feel organized . . . That piece of how people feel included and how people feel like they have the tools to do their best work, I thought was really profound. And you know as someone who is, as Naledi put it, *pressure prompted*, I often feel like that's a failure on my part. Whereas, you know, that it helped me for myself reframe like this isn't a failure it's actually just the way I work and the way I feel organized. So how do I compensate for that in ways to help other people feel organized.

The workshops changed the way participants perceived themselves and others. Learning that people prefer to work, learn, and communicate differently for a variety of legitimate reasons helped participants understand how these changes can create conflict or challenges. That difference may create challenges that can be faced and overcome rather than signify an individual failing resulted in participants being more aware of and supportive of others who are different than themselves.

### Having the Right Tools

When asked about the most important takeaway from the workshop, many participants listed the various tools presented across the modules. It seems that the IMT core concepts and ideas—such as, providing clear expectations, that there are different types of feedback, communication can be inclusive or marginalizing—once presented seemed so obvious but resulted in participants thinking very differently about the way they can work, interact, and manage. As one comment illustrates, “We've had several uncomfortable and hostile incidents at our company. I now better understand why they occurred and can help reduce or prevent future incidents from happening.”

Some participants referred to specific frameworks, organizers, or processes that were particularly helpful. In an interview, one participant explained the profound impact of Blanchard's Model of Situational Leadership in reframing their identity as a leader:

It was new to me I thought as a leader I need to show up in a space of leadership with my leadership philosophy and that's the leader I'm going to be. For example, as soon as my direct reports started I started in coaching mode because that's what I thought that's the type of leader that I wanted to be—giving her lots of space to decide, saying “these are all of the possibilities you know I trust that you can decide” you know, or “I hired you because I knew that you could do all these things, now go with it.” And that didn't work for two reasons. One is, what I learned, is that when someone starts in an organization, they just don't have enough context to be in coaching mode already and there needs to be that directing [mode] from the manager. Otherwise, [the direct reports] are feeling at a loss, they feel like they're going to make a mistake, and then there will be a shame that they made a mistake. Basically, I wouldn't have set them up for success. [The other thing I learned] was that the person was just not at a career stage to be comfortable with coaching type of management questions because they felt I already knew the answer, but I was testing her to see what

would be the right answers which is totally an indirect and unwanted bad consequence of using coaching type of questions.

It was common for participants to refer to the frameworks and tools learned in the workshop in helping them understand how to be a more inclusive manager. For example, one comment noted that the presentations included examples of language that can be useful in addressing issues. For this participant they saw the sample language helpful in perceiving ways to “to give power back. [It] helped me envision implementing the strategies and having words to use.” Even before implementing what they had learned, these workshops were powerful in making participants aware that when an issue arises, they now have tools to deal with it. For example, in one interview, the participant explained that lab meetings were often contentious and demoralizing. Though they had not yet implemented any of the tools and strategies, it was meaningful for them to know there was an approach to use to improve their meetings:

I think it was the CPR. Just having a procedure in place before you go into meetings and before the problem arises, set out goals that will be triggered as the problem develops, rather than in the heat of the moment trying to find solutions that usually don't work out well.

Though this participant shared that they had not yet implemented any of the strategies, they were gratified to know that they had some options for moving forward productively.

Some responses did not refer to a specific tool but to the benefit of learning and having available to them a well-organized sequence of modules focused on underlying principles and practical implementation tools:

The biggest impacts that the workshop had was giving me specific frameworks and language that I can use as I'm transitioning into more of a mentor manager role. Like having a timeline and a structure for how to give feedback, or how to intervene if someone is not performing as expected. It's really helpful for me in mapping out what situations will look like and coping ahead for difficult management situations.

Without necessarily citing any one module or tool, the workshops have enhanced participants' ability to perceive and analyze a variety of work situations. Still, it seems worth noting, because so many participants did remember and refer to specific tools and concepts, that providing a set of concrete tools organized around discrete topics seems to have been a crucial element in helping participants to internalize that when there are issues that arise in supervision, there are steps to take to address them.

The data discussed above suggests that IMT is successful in impacting perceptions and thoughts because important ideas are assigned easily remembered monikers (e.g., 7 Responsibilities, OKRs, Backward Design, CPR) and complex processes are streamlined into concrete steps and checklists (Tell/Know checklist, 5 Strategies to Add Inclusivity) allowing participants to recall and refer to them as they build their leadership practice. By keeping the key ideas from the workshop in mind, they become more aware of the potential for bias and more empathetic toward others different from themselves. They now have a variety of frameworks to identify and assess situations and they have access to evidence-based approaches to address those situations to fulfill, more inclusively, the responsibilities they have as a research mentor. The responses described in this section provide ample evidence that the IMT workshops impacted the way participants think about mentoring, what they expect from others who are mentoring and managing, how they perceive themselves and others in the workplace, and how they envision themselves as an inclusive research mentor.

### **Impacting How Participants Behave**

I almost I don't know anymore how I thought about [inclusion] before. Something that Naledi said at some point is “diversity is a fact, equity is a choice, belonging is the result, and inclusion is where we do the work to make all of this happen. And I thought I had heard of course you know the explanation of the acronym many, many times and you know--inclusion is the act to make everyone feel welcome and and everything—

but I just thought this was the philosophical framework that really spoke to me. Inclusion is where we actually roll up our sleeves and get to the work and that made sense to me.

- University Program Manager

The long-term goal of the equity work engaged in by this project team has been to transform biotechnology into an inclusive and diverse STEM education and career field. The team understands that this includes not only culture change, but systems change. In the previous section, the evidence is strong that the IMT workshops have been successful in impacting participants' ideas and perceptions about the role of mentoring and supervision in fostering a more equitable workplace, at least in the short term. The evidence that the IMT has also resulted in a change of behaviors is presented.

After the first IMT series in the Spring, of the 19 concepts, strategies, or tools listed, 17 were reported as having change participants' behavior by at least 50% of responders. Four tools received a positive response by at least two thirds of respondents were: a) 7 Responsibilities of a Supervisor (67%), b) Understanding Workstyle Preferences (69%), c) Setting Goals with Objectives and Key Results-OKRs (67%), and d) Inclusivity Check: Setting Expectations (67%). These were reflected in the comments from both series of workshops as well.

In an interview, one senior researcher from a small startup explained how the workshops changed their perception of struggling colleagues and consequently changed in how they behaved:

We have scientists at different levels here. And before, if someone didn't complete a task or they were slow about it, it's kind of, I just assigned blame like, "Oh, you were just lazy" or "You're just not very competent." But then this class taught me to ask the question, "Hey, what's going on? Why were you unable to complete a task by this deadline? and how can I help?"

Again, this tendency to stigmatize poor performance or pathologize ways of working and interacting that are different were key insights and led to changes in behavior. Not only having empathy for but also respecting as legitimate these differences is necessary in an inclusive environment.

Another skill noted as being very important takeaways was understanding better how to give, solicit, and respond to feedback. Many participants reported this skill as having a consequential impact and some of the comments provided more detail. For example:

This training has made me better appreciate the different working styles of people in my lab. also recognize that most of my lab mates are internal processors. When I give a presentation where I want their feedback, I try to give multiple opportunities for them to voice ideas throughout the meeting and afterwards rather than expecting all their comments to come immediately when I introduce the ideas.

The training made the researcher aware that because of their workstyle preferences, expanding options for providing response increases the ability of colleagues to participate and offer feedback. Several participants shared that understanding the different types of feedback and when and how to incorporate it, helped them to be more effective. This survey comment is illustrative:

[The most valuable concept or tool was] how to provide structured criticism. I tend to couch my criticism with niceties which I know have made my feedback difficult to follow. But I didn't know how to shift this without being too blunt or coming across as insensitive. I have used the techniques in the course several times since and find that it allows me to be measured, thoughtful, and maintain compassion while not sacrificing any clarity.

One experience academic manager reflected during an interview that the training led them emphasize setting expectations around feedback a focus of their onboarding process of recent hires:

The teach, train, and delegate language and frameworks I found really useful for setting expectations for new people. So, for example, in addition to the sort of regular this-is-who-we-are-and-what-we-do work, I made sure to set expectations up front using some of the language and slides from the course with my new staff . . . I'm hoping that that piece, I mean, that's the piece that you know, I think has power to address disparities and microaggressions—disparities in the way that people are treated at work—if we can set expectations of behavior up front. Particularly [expectations] around giving feedback and normalizing feedback. That's the piece I think that I really stressed when I implemented it for my own onboarding. That we're trying to create a culture of ongoing and immediate feedback so if something happens, let's find ways to say something. Supporting that kind of culture.

Like the participant above, more participants listed learning about setting expectations as particularly important. A few offered other examples of how it has changed how they work.

The most valuable tool I found was "setting expectations". I did not realize earlier how important it is for a mentor to set detailed expectations. I have started implementing it as a mentor myself.

I have the five step "Not meeting your expectations?" slide printed out and hanging by my desk. I look at it and think about it all the time. I've been trying to implement it in small ways across various professional interactions.

In the following excerpt, a junior industry researcher describes how the responsibility to take a baseline assessment and the knowledge of backward design helped them to acknowledge and respond inclusively to the diversity of their interns:

I have two interns this semester and I'm really excited. I think they're like both really strong students but at super different stages of life with really different experiences and backgrounds. Already [what I learned has] been helpful in me like understanding their strengths and weaknesses and their backgrounds and like what we need to build on.

One of the students is transitioning careers so she has like spent quite a bit of time and one workforce and wants to now work in the biotech workforce and so she has really specific goals for her kind of transition period like skills she wants to attain things she wants like tangible demonstration of her abilities as she's going on to the biotech job market. we really sat down and were like what are the key skills that you think would make you most marketable? How can you get those in your internship? and where can we put you that would like most likely result in your ability to contribute to a publication so that she has a publication on her record.

The other student has just finished high school has been at [the community college] for a few years and is hoping to one day go to a four-year university but has a much less clear educational path. This student wanted to build mastery in one particular skill and so we spent some time hashing out what skills were most interesting or would be most amenable to him doing repetitively and building some expertise in. Then, finding a place on the project that he would be able to contribute that skill. I think having like the knowledge around how to take a baseline assessment and how to like set expectations based on their goals was really helpful for me.

Using the knowledge and tools learned from the IMT, this junior scientist demonstrated that setting expectations begins with understanding the expectations of the mentor/manager, as well as the expectations of the intern, and curating an internship experience that would best meet the needs of both. Another participant shared that by using the tools for setting expectations and the responsibility to teach/train/delegate, they had created a process in which their direct report felt cared for by her supervisor:

The Teach/Train/Delegate was very enlightening to me. Naledi taught us how to create a development plan for a trainee or a manager and I've literally used that. I had a frank conversation with my direct report about



the area that was really a big area where I wanted her to improve. I decided for the first [meeting] to do the work myself, so I sat there asking myself, what is it really that I wanted to do? What is going to be the way I'm going to evaluate her? And then I designed the pieces in between. So, here's your training path to get there. Then we had one of our reflection meetings where I illustrated this to her. And she was super on board because she felt taken care of. She felt that I was really invested in her doing well. Because I basically said, if you do all of this and you fulfill this macro goal, this is going to set you up for a promotion.

While some participants share their tendency to shy away from corrective feedback, this changed once given the tools. In this case, the participant saw that providing critical feedback, alongside guidance, was seen as a demonstration of care and investment by the recipient.

### **Impacting Organizations**

Some say knowledge is power. The experiences of one junior research scientist supports this. First in and one interview participant shared two ways the training has empowered them to enact leadership within the organization:

After going through the training, I actually became more involved in diversity and inclusion efforts. Within our department we started up a committee and we are currently looking into our hiring practices. Immediately it was like, I have this resource of literal things we can do so, you know, let's not swirl around. Let's choose things to do and do them as opposed to debating. It provided real tangible um actions for us to take and so that has been a lasting impact. I think, yeah, just like having this in my back pocket and being exposed to it more has enabled me to really pitch ideas and kind of like steer the direction of the committee. It's been very impactful in in terms of hiring within my department as well as from the internship program that I'm leading.

I'm not a lab leader. I'm more the bottom rung, so it's really me managing up in these committees--you know, using my voice to say, Hey, you're basically from the eyes and perspective of PHD, right? You're older--whatever—you're certain race. What if you invited someone who doesn't have the PhD or doesn't look like you or come from where you come from to also review these candidates' résumés with respect to hiring? and kind of pitching that. And really questioning and pushing them to really question the status quo. I'm not necessarily from the committee in a leadership role I'm like a member but I definitely broadcast that out, question everything. And people hear what I say and make changes appropriately. . . I think a lot of healthy skepticism keeps us coming back and asking, we've made this change. Are we doing what we intended to do? Are we doing it in a way that is leading to what we're trying to accomplish?

The above examples provide clear evidence of impact on behavior resulting from participation in the IMT workshops. In some cases, the behavior changes centered on their own managing activities. In other cases, the actions had a broader impact, actions that held out the possibility of broader change within the organization. Several of the participants interviewed spoke of their enthusiasm in sharing what they had learned with colleagues. Important to many was the added legitimacy of the evidence-based foundation of the theories and frameworks and tools. They spoke animatedly of the exceptionally experienced and professional team of experts leading the course. The research and credentials that undergirded the workshops and presenters instilled confidence in and commitment to the principles and tools participants shared with others and implemented in their own practice.

As in the excerpt above, several other participants reported that they had already implemented more inclusive hiring processes in their organizations. Other comments provided evidence that some participants have not only changed their thinking but have inspired and sometimes empowered them to begin making changes in their organizations. One of the participants interviewed explained how they hope this training can begin the long process of cultural and structural change in the organization:

After the first session I was like, Oh that was really good. I'll go back! So, in terms of impact, one thing I will say is that I suggested to our administrative director in my unit that we offer it for all the managers in our unit and so we're doing that.

I think I think you can really only do so much at an individual level, right, and I guess when, in the context of these trainings, what is you know—if the point is only to shift individuals' behavior, I don't think that's enough. I think part of what trainings like this have to do is open people's eyes to the structural ways that inclusion and belonging are not accessible to others and provide tools or, you know, sparks of ideas or whatever to shift culture, to really shift culture and shift structures. Because that's the only way to create an actual culture of belonging and inclusion.

[My motivation was that] I thought this training was particularly useful and all of us can use training on these skills. So that's at a basic level, I think at a larger level that having a common experience and common sort of language to talk about [equity and inclusion] I think will open some doors for us to talk about some deeper issues around culture and belonging.

From the perspective of this experienced manager, bringing IMT to the larger team of managers—because of the high quality of the workshops, the program's focus on inclusion, the provision of frameworks, strategies, tools, and language to help participants implement the workshop content—has the potential to foster deeper change in the organization, not just individual behaviors, but the culture and structures that perpetuate inequity and exclusion.

In conclusion, it cannot be argued from the evidence gathered in this evaluation, that organizational change has been a widespread impact of the grant. However, it is justifiable to conclude that the IMT training has made progress on its goal to support the evolution of biotechnology workplaces in becoming more inclusive. Not only have participants begun to use the tools and share the tools with colleagues to alter organizational practices, but the workshops have empowered participants to take on leadership in equity efforts. It has validated participants' ethos of inclusivity and the evidence-based practices and instructional expertise of the team have provided the legitimacy of their efforts to change their work and their organizations. It has led to the expansion of training within organizations in inclusive mentoring and managing and thus begun the building of these organizations' collective capacity for the work of inclusion.

## DISCUSSION

An underlying premise of this grant is that increasing opportunities for community college students to enter and stay in the field of biotechnology requires more than increasing the employability skills of the students. It also means addressing the cultural and systemic barriers that tend to work against diversity and inclusion. Such work is a long-term project that includes changing the way people think and perceive themselves and other; the way they behave; and the systems, processes, and rules that govern the organization of their work. The project team has theorized that this kind of change is possible by providing professional development through a series of workshops given over the course of a month. Given that a common complaint regarding professional development in education is that it is typically designed as a one-time workshop, or “one-off” and fails to produce lasting change, the team's goals are ambitious.

It might be useful to conceptualize the theory of change for this project as an iterative process that begins with the individual and moves out into the organization. It begins with changing how participants perceive their role as research mentors and progresses to changing the ways they enact their roles. Inspired and motivated by the content, they share what they have learned, perhaps invite others to take the course. As more members of the organization begin to reflect and question practices, changes in organizational culture and practices becomes possible (see Figure 3). To enable this kind of change, it is reasonable to assume that the first step is creating a workshop series that is highly engaging with content that is accessible and memorable—that is, it is a workshop built on sticky ideas.



Figure 3. The IMT Theory of Change



After the publishing of the book *Made to Stick: Why Some Ideas Survive and Others Die*<sup>2</sup>, by Chip and Dan Heath, the concept of sticky ideas became part of the mainstream. In the book, the authors describe the characteristics of ideas that people will remember:

- Simple – find the core of any idea or thoughts
- Unexpected – grab people's attention by surprising them
- Concrete – make sure an idea can be grasped and remembered later
- Credible – give an idea believability and credibility
- Emotional – help people see the importance of an idea
- Stories – empower people to use an idea through narrative

The Inclusive Mentor Manager Training workshops incorporate most or all of these characteristics. The team developed each module around a core idea in inclusive management and mentoring, provided frameworks to succinctly organize the main concepts, shared tools such as checklists and tables that provided procedures and language to help participants remember the ideas, cited the research supporting their evidence-based practices, developed scenarios to provide concrete illustrations of their ideas at work.

Many were motivated to take the course because they found themselves in supervisory roles with little or no management training and appreciated learning theories and tools that exist to create structure around supervision and management. Others commented that they felt validated by the training, that research had legitimized beliefs and practices they utilized in their management. Still others, who had actively engaged in leadership and management professional development noted that this workshop, with its focus on inclusion, was unique in tying both concepts together using case studies and examples that were “on point” for one in a biotechnology work setting.

For the project to succeed in changing perceptions and thoughts about inclusive managing, their workshops had to present ideas in a way to make them “sticky”. For the project to succeed in changing behaviors, the training needed to provide participants with tools that were straightforward, readily available, and unmistakably relevant. This evaluation demonstrates that the team was very successful in creating a professional development program that was relevant to biotechnology professionals in industry as well as academic settings, and that it had powerful impacts for a large proportion of the participants.

Though it is not possible to evaluate the long-term impacts of the grant, we hoped that by surveying participants one month after the completion of the workshops would allow us to say something about a lasting impact on participants. The interviews, held two to three—and for some nine—months after the workshops, were intended to find evidence of lasting personal and perhaps, organizational impact.

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<sup>2</sup> Heath, C. and Heath, D. (2007). *Made to stick: Why some ideas survive and others die*. Random House.

From the survey comments and interviews, it is also clear that this training program had a powerful impact on many participants—for those who were new to or not yet in the position of supervising others as well as those with many years of experience. For many, it made explicit and comprehensible how personal and systemic biases that lead to inequitable practices. More importantly, the training provided evidence-based concrete and straightforward tools for overcoming such practices. Not only was the training highly engaging, but it also made use of a variety of methods for making the ideas sticky, increasing the likelihood that participants would be able to recall and make use of what they had learned.

## RECOMMENDATIONS AND CONCLUSIONS

During the second year of the grant, the team incorporated their research findings into a revised professional development program the Inclusive Mentor Manager Training for biotechnology supervisors, research mentors, and leaders. The training program was highly rated by participants who commented not only on the relevant and important content but also on the masterful and engaging pedagogy. In surveys, participants frequently commented that the training was thought-provoking and had opened participants' eyes and minds to the important role of supervision in creating an inclusive workplace. Many also commented that the specific frameworks, tools, and sample language provided during each of the modules helped them immediately implement aspects of the training. For these participants, they had been able to personalize, incorporate, and some began sharing what they had learned. As shown in the theory of change in Figure 3, this spreading of the frameworks, strategies, and tools into and throughout the organization is an important element of the process of creating more inclusive work environments.

This translation of theory into practice has not been as straightforward for all participants. In several survey and interview comments, participants shared that the modules were intense and rich in content and for some, even with the frameworks and checklists, they admitted to struggling to implement changes in their practice. Some felt they did not know where to start in making changes. Others needed more guidance to translate the frameworks into their own context. After having been asked if the training had changed their behavior one interviewee commented:

"I'm working on it. I think honestly it was, what six sessions or eight sessions and it was really overwhelming. It was really well done, but it was really overwhelming. It's just like, "Oh my God this is like, Wham!" As a person who *is* a manager, who *is* a supervisor, who *is* a coach right behind [the interns] teaching them lab skills in the lab--and it's like, "I can't do all of this. If you did it all, that's all you would, so it was you would have no time to do whatever else you might supposed to be doing."

[In the 5 Strategies Checklist] there are like 5 columns and two or three things under each column, so that's already thirteen things I'm supposed to be doing and keeping in mind. And, like I said, it was, everything was, just packed in there, and I think it was all really good. And, oh my God I have to go and like really go over this in more detail, you know--on my own.

So I think if they [project team] wants to branch out more with this they're having structuring it a little more so people have a chance to practice together or try these things out and get ongoing support or just come to grips what they mean. I think there's all these concepts here and they're crazy ton of them they're all good. How do I just pick one or two to work on, actually try to implement, and see if it's making a difference?"

This participant is struggling with multiple aspects of the change process. First, they are trying to remember and understand everything that was presented. Then they are struggling to really apprehend what it looks like to incorporate the practices into their work. They are overwhelmed by the need to make a choice of what to implement among the many elements of the training given their perception that implementing any of the changes necessarily interferes with the work they are "supposed to be doing." The first challenge then, is to find a way to translate information into learning and ultimately into action. The next challenge is to build support within the organization—to turn this work into the work they are supposed to be doing.

The experience shared here is probably not uncommon and one reason for the often-reported failure of many professional development trainings to result in lasting change in practice. Understanding this challenge, the team built into the program opportunities for ongoing support, not only by making themselves available

immediately after each module but available generally. They are also in the early stages of building a virtual learning community. This will take some time and may be useful for those prone to investing in the time to participate. For those participants who are not investing in ongoing support options, there is a limit to how much impact project-based support may have.

When only one member of an organization attends the training, the onus is on that one individual to share what they have learned and advocate and motivate change. By increasing the number of individuals inside an organization—such as the interviewee who brought the training in-house for a large group of supervisors—the collective capacity for change is strengthened. There is a common language, a common set of principles and tools with which to work to reconceptualize the culture and systems put in place.

A recommendation for the coming year is for the team should consider encouraging or incentivizing participants to sign up for the training as part of a larger cohort of colleagues within their lab or organization. In the breakout sessions, these cohorts would have an opportunity to begin the process of meaning making and translation that can strengthen the likelihood of change and perhaps begin the march toward lasting change.

In conclusion, the results from the surveys and interviews provide ample evidence that participation in IMT leads to impacts that include changing individual perceptions of the role that research mentors play in fostering inclusion, and that in many cases the heightened awareness, knowledge, skills, and tools they learned have changed the way they engage as mentors and colleagues. Still more importantly, perhaps, evidence suggests that the value of this training for participants leads to sharing information and ideas with others and therefore this training has the potential to be instrumental in changing culture, processes, and systems within participants' organizations. In thinking about how the program can support participants and organizations in adopting and implementing the ideals and tools shared in the IMT program, one step to consider would be to encourage members of organizations to attend the training as part of a larger cohorts encouraging them to make meaning of their learning together and work together to find ways to implement what they have learned in the context of their own organizations.

## APPENDICES

### APPENDIX A: SPRING 2022 IMT MODULE SURVEY

Thank you for participating in the UCSF-CCSF Inclusive Research Mentor-Manager Training! Your input on the training will help us continue to improve and refine the content and delivery. Your personal information will not be shared with anyone outside the UCSF-CCSF NSF project team. Data shared with others outside of the project team will be done in an aggregated way (such as averages or means) or in a completely anonymous manner.

1. Please indicate your current position:
  - Biotechnology Industry Professional
  - UCSF graduate student, postdoc, faculty or staff
  - Non-UCSF graduate student, postdoc or faculty
  - Community College Instructor or Staff
  - Other
2. How much experience have you had any experience as a mentor and/or supervisor?
  - None
  - Less than 1 year
  - 1-3 years
  - More than 3 years
3. Please indicate your level agreement with the following statements regarding today's workshop: (Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree)
  - a) The workshop content is relevant to my organization.
  - b) The content and examples in the workshop were applicable to my organization.
  - c) There is a need for this type of training at my organization.
  - d) This workshop prepared me to better mentor-manage diverse trainees.
  - e) Implementation of the concepts and/or tools from today's workshop would lead to increased productivity, morale and well being at my organization.
  - f) The workshop was a good use of my time.
  - g) I will implement at least one tool or strategy from today's workshop
  - h) My organization would be receptive to implement the training covered in today's workshop.
4. What are the most important, thought provoking or inspiring things you have learned during today's workshop?
5. What are 1-3 ways that you will implement what you learned today in your relationship with your current or future subordinate or mentees? (e.g.: frameworks, tools, approaches, language, etc.)
6. What barriers might you face to implementation?
7. How would you like to learn this type of content? (choose all that apply)
  - Online Workshop (current format)
  - In-person Workshop
  - Pre-recorded Webinar
  - Articles or other text documents
  - Short videos with reflective questions/activities
  - Other
8. How would you like to access this type of content (after initially learning the content)? (choose all that apply)
  - Pre-recorded Webinar
  - Articles or other text documents
  - Short videos with reflective questions/activities
  - Other
9. Is there anything else you'd like us to know as continue to develop and disseminate these workshops?
10. Thank you! We would love to discuss your insights further as we adapt our trainings and tools industry. Would you consider discussing your experience with us?
  - Yes
  - No
  - Maybe

## APPENDIX B: SPRING 2022 IMT FINAL SURVEY – SPRING 2022

1. Please indicate your current position: - Selected Choice
2. What have you found to be the most valuable concept or tool from the training and why?
3. Did you attend: Module 1 - May 12 - Are you ready to be an inclusive research mentor/manager? How good people unintentionally build inequitable work environments
  - a. Please indicate how each concept or tool in Module 1 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Assess Yourself: 4 Benchmarks to be an Effective Mentor/Manager/Leader, 5 Strategies: Inclusivity is a design question, Inclusivity Check: Meetings, 7 Responsibilities of a Supervisor
4. Did you attend: Module 2 - May 17 - Effectively supervising people who aren't you: Managing different workstyles
  - a. Please indicate how each concept or tool in Module 4 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Understanding Workstyle Preferences: How do you do your best work?
5. Did you attend: Module 3 - May 19 - How to transparently set (performance and conduct) expectations
  - a. Please indicate how each concept or tool in Module 5 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Setting Goals with Objectives & Key Results (OKRs), Tell/Know Checklist, Inclusivity Check: Setting Expectations
6. Did you attend: Module 4 - May 24 - Teach/train and delegate: Using best practices to train your diverse team
  - a. Please indicate how each concept or tool in Module 4 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Building a Training Plan: Backward Design from Expectations Inclusivity Check: Teaching & Training Delegation: Blanchard's Model
7. Did you attend: Module 5 - May 26 - Communicating inclusively: developing your own feedback strategy and style
  - a. Please indicate how each concept or tool in Module 5 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Renniger: 4 Steps to Feedback 5 Step Feedback Loop
8. Did you attend: Module 6 - May 31 - When someone isn't meeting your expectations: Strategies and resources to manage performance equitably
  - a. Please indicate how each concept or tool in Module 6 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Assessing the Issue: Problem Identification Progressive & Productive Responses to Expectation Challenges Responding from all your roles Building Your Mentor-Manager Circle of Support
9. Did you attend: Module 7 - June 2 - How to inclusively hire: Which strategies will you use?
  - a. Please indicate how each concept or tool in Module 7 affected you (select all that apply): It changed my thinking, It changed my actions/behaviors, I shared it with someone, I don't remember this, No effect
  - b. Building Your Hiring Rubric Building Your Interview Questions Inclusivity Check: Writing a Position Description
10. What (if anything) from the training have you implemented or plan to implement?
11. Is there anything from the training you would like to implement/utilize, but need further support/help to do so?
12. Is there anything else you'd like us to know as we continue to develop and disseminate these workshops?

**APPENDIX C: FALL 2022 IMT FINAL SURVEY – FALL 2022**

1. Please indicate your current position: - Selected Choice
2. Are you currently mentoring, managing and/or supervising anyone?
3. Please indicate your level agreement with the following statements regarding the Inclusive Research Mentor-Manager Training:
  - a. The training changed my thinking
  - b. The training changed my actions/behaviors
  - c. I shared a tool, strategy or information from the training with someone else
  - d. The training has impacted procedures and/or policies in my workplace
  - e. I would recommend the training to my colleagues
  - f. There is a need for this type of training in my organization/workplace
4. What have you found to be the most valuable concept or tool from the training and why?
5. Please take a moment to describe a specific impact this training has had on you, your team, and/or your organization (e.g., ways in which your participation in this training has influenced your thinking, your actions, your lab/organization's procedures, your policies, your relationships, your productivity).
6. Which Modules did you participate in? (please choose all that apply)  
Please rank which concepts and/or tools from the training were the most important and/or relevant for you

1. Assess Yourself: 4 Benchmarks to be an Effective Mentor/Manager/Leader	2. 5 Strategies: Inclusivity is a design question	3. Inclusivity Check: Meetings	4. 7 Change Management Principles
5. Role Conflict	6. 7 Responsibilities of a Supervisor	7. Workstyle Preferences: How do you do your best work?	8. Tell/Know Checklist
9. Setting Goals with Objectives & Key Results (OKRs)	10. Inclusivity Check: Setting Expectations	11. Building a Training Plan: Backward Design from Expectations	12. Inclusivity Check: Teaching & Training
13. Delegation: Blanchard’s Model	14. Renniger: 4 Steps to Feedback	15. CPR: Content, Pattern, Relationship	16. Off-Ramping: 3 steps to take if the conversation takes an unexpected turn
17. 3 steps to inclusively manage performance/conduct issues	18. Progressive & Productive Responses to Expectation Challenges	19. Responding from all your roles	20. How mentors/managers + organizations (together) can make a difference
21. Hiring: To disrupt inequity, break down each managerial task and add inclusivity at every step.	22. Design Your Hiring Assessment Tool		

7. Is there anything else you’d like us to know as we continue to develop and disseminate these workshops?
8. Your insights are valuable to us. Would you be willing to be contacted by our grant evaluator to schedule a brief conversation to further discuss the impacts of the training for you?
9. Thank you! Please include your contact information below so our grant evaluator can reach out to you sometime in early 2023:
  - Name
  - Position/Organization
  - Email Address

## APPENDIX D: INTERVIEW PARTICIPANTS AND QUESTIONS

<u>Interview Date</u>	<u>Sector</u>	<u>Position in Organization</u>	<u>Currently Supervising</u>	<u>Modules</u>
2/6/23	Industry	Chief Executive Officer	No	Fall 2022 IMT: All modules
2/8/23 7	Industry	Education & Training Specialist	Yes (HS, Coll)	Fall 2022 IMT Modules 1, 2, 3, 4, 6,
2/9/23	Academia	Postdoc	Yes (CC)	Fall 2022 IMT: All modules
2/10/23	Academia	Director of Scientific Programs	Yes	Fall 2022 IMT: All modules
2/13/23	Industry	Senior Scientist	Yes	Fall 2022 IMT: All modules
2/14/23	Academia	Postdoc	Yes	Fall 2022 IMT: All modules
2/28/23 7, 8	Academia	Senior Program Manager	Yes	Fall 2022 IMT: Modules 1, 2, 3, 4, 6,
3/1/23	Academia	Community College Faculty	Yes	Fall 2022 IMT: Modules 1, 6, 7
3/2/23	Industry	Sci. Researcher, Intern Program Manager	Yes	Spring 2022 IMT: All modules
3/7/23	Industry	Chief Science Officer	Yes	Spring 2022 IMT: All modules

## QUESTION BANK

### Pre-Course

- Can you tell me about yourself a bit, your current work and roles you inhabit in your work?
- How did you hear about the course?
- What was your motivation in taking part in the Inclusive Manager/Mentor Training?
- Have you ever experiences in being marginalized? To what extent did this course speak to that?

### Impact on Thinking, behaviors, processes, policies, organizational practices

- In what ways has participation in the IMT impacted the way your thinking (look for inclusivity)?
- Is there anything from the training that you have been able to incorporate into your work? Something that was particularly helpful and why?
- Do you feel that this training has influenced your experiences or your team’s experiences at work?
- What strategies, concepts and tools, frameworks, strategies, language tools do you feel are influencing your behavior? Can you talk to me a little more about that?
  - a. We provide frameworks (evidence-based frameworks)
  - b. Strategies for which to use or apply the frameworks
  - c. Tools to (checklist) to help them use
  - d. Language that facilitates the way they use the tools
- Overall, what would you say was the most significant impact for you from your participation in the workshops and how do you see this training influencing you moving forward?

### For industry Participants:

- Can you talk to me about any of the workshop content—perspectives, tools, or strategies –that you felt were not particularly applicable to your industry setting?

- Teaching this training to the equivalent to the team leader, and teaching to the person being lead . . As a team leader this should help make the experience better for my team. For my team it gives them clarity of my expectations. You or your team.
- In what ways do you see the potential for this training to improve your workplace?

## APPENDIX E: PARTICIPANT DATA

### **Companies Represented by Workshop Attendees & Registrants**

<u>Company Name</u>	<u># Attended</u>	<u>Company Name</u>	<u># Attended</u>
AbbVie	5	Inscopix	1
Alivamab Discovery Services	1	Lawrence Berkeley National Lab	11
Allakos Inc	1	Lin-zhi International, Inc	3
Ambys	1	Mammoth Biosciences	1
Amgen	2	Mantra Bio	2
Bio-Rad	1	Meissa Vaccines	2
BioAmp Diagnostics	3	Navega Therapeutics	4
BioLumen	1	Neuron23	1
Bristol Myers Squibb	2	Nitrase Therapeutics	2
California Life Sciences	5	Novozymes	7
Capsida	1	Nura Bio	1
Caribou Biosciences	4	Olema Pharmaceuticals	1
Chimera Bioengineering	4	Pace Analytical	1
Circle Pharma, Inc.	1	Pipeline Therapeutics	1
Citeline	1	Prose Foods	1
CODA Biotherapeutics	1	Salve Therapeutics	1
Cytokinetics	7	Scientist.com	1
Denali Therapeutics	16	Skoruz Life Sciences	1
Eclipse Bioinnovations	1	SPARCBIO	1
Emergent	1	The Patients' Academy for Research Advocacy	1
Fred Hutch Cancer Center	4	Ultragenyx	1
Genentech	9		

### Companies Represented by Registrants Who Did Not Attend

Acepodia Biotech Inc.	ImagineRx, Inc.	Scopi
AcuraStem	Invitae	Sonoma Biotherapeutics
Agilent	Merck Research Laboratories	Soteria Biotherapeutics
Autobahn Labs	Nektar Therapeutics	Sundial Foods
Avirmax	Nkarta Therapeutics	Synthego
Bristol Myers Squibb	NOBIC	Tenaya Therapeutics
British Consulate	Pendulum Therapeutics	Underdog Pharmaceuticals Inc.
Curebase	Merck Research Laboratories	UTHSCSA
Eikon Therapeutics	PerkinElmer	XiltiX North America



**APPENDIX E: PARTICIPANT DATA (CONT'D)****Academic Institutions Represented by Workshop Attendees**

Academic Institution	# Attended	Academic Institution	# Attended
Breakthrough SF at SF Day School	1	San Francisco State University	1
California Community Colleges	1	Santa Monica College	<u>1</u>
Cedars-Sinai	1	Scripps Research	1
Center for Excellence in Nonprofits	1	Southern Maine CC	1
City College of San Francisco	1	St. Jude Children's Res. Hospital	1
Contra Costa College	1	St. Louis Community College	1
CZ Biohub	1	Stanford University	1
Dana Farber Cancer Inst./Harvard Med	1	UC Berkeley	13
East Los Angeles College	1	UC San Diego and GCC	1
Florida State University	1	UC Santa Cruz	1
Forsyth Tech	1	UCLA	1
Gladstone Institutes	1	UCSF	172
iBiology	2	UCSD Extension	1
Johnstone Community College	1	University of Florida	1
Laney College	1	University of Southern California	1
Merritt College	1	University of Virginia	1
Michigan State University	1	University of Washington	4
MiraCosta College	1	Valencia College	1
National Renewable Energy Lab	1	Washington University in St Louis	1
NYU Grossman School of Medicine	1	Waubonsee Community College	1
Oregon Health & Science University	1	Whitehead Institute/MIT	1
Penn State	1	Yale University	2
San Francisco Dept. of Public Health	1	Zuckerman Inst. at Columbia Univ	1

**Academic Institutions Represented by Registrants Who Did Not Attend**

Bakar Labs	Tulane University
Cabrillo College	Univ. Michigan
Contra Costa County Health Services	Univ. Minnesota
Durban University of Technology South Africa	University of Arizona
Foothill College	University of Pittsburgh
SRI Int.	U of TX Health Sci Ctr at Houston-Sch of Pub. Health

**APPENDIX E: PARTICIPANT DATA (CONT'D)**

**Registration and Attendance of UCSF Community Members**

		<u>Individuals Registered</u>	<u>Individuals Attended</u>
Spring 2022 IMT	UCSF Faculty or staff	20	17
	UCSF Postdoc	54	42
	UCSF Student	35	29
	Totals	109	88
		<u>Individuals Registered</u>	<u>Individuals Attended</u>
Fall 2022 IMT	UCSF Faculty or staff	23	14
	UCSF Postdoc	66	46
	UCSF Student	15	9
	Totals	104	69