

Expanding Potential 2016 Workshop Summary and Analysis

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Table of Contents:

Background

Workshop Summary

Value and Outcomes

Survey Analysis

Quotes and Testimonials

Background:

Expanding Potential is the main diversity program of the Synthetic Biology Engineering Research Center (Synberc), a multi-institutional NSF center headquartered at UC Berkeley that aims to make biology easier to engineer. Expanding Potential aims to help students and professionals recognize and understand social problems that may hinder the success of underrepresented groups and encourages and supports programs that change STEM cultures and increase inclusivity. The program includes a mailing list consisting of Expanding Potential updates, events, articles, and opportunities, topical meet ups, a seed project program, and our annual workshop.

The four goals of the two-day 2016 Expanding Potential Workshop were: 1) to bring together social science researchers and STEM professionals to explore why certain groups are underrepresented, 2) to bring together diversity and STEM professionals across disciplines to share best practices, 3) to connect underrepresented individuals to program developers to address the real challenges to inclusivity, and 4) to develop shared mechanisms to sustain, scale, and assess individual programs. The first day centered on “Recognizing the Issues”, and the second day centered on “Developing the Solutions”. To achieve these goals, we brought together several groups who are integral to creating a more diverse and inclusive STEM landscape:

- Social scientists who conduct research on the design and assessment of diversity programs.
- Underrepresented individuals in STEM who can share their personal experience and help create solutions.
- STEM researchers and professionals who are less familiar with issues of diversity and inclusion but who are motivated to enact change.

Workshop Summary:

To view all of the speakers, speaker bios, program, presentations, and abstracts, please visit the Expanding Potential 2016 Workshop Program page (<https://www.synberc.org/Expanding-Potential-2016-Program>).

The motivation for the workshop was to bring forth the idea that while topics around diversity and inclusion are becoming more commonplace, the increase in awareness has not resulted in significant change. Even as concepts like unconscious bias, stereotype threat, and microaggressions are more broadly recognized, there is clear evidence that diversity is not reflected in leadership roles, speaking opportunities, and STEM labs. In fact, when looking at the investment to be more inclusive in the past few decades, the STEM community has had modest success as evidenced by the lack of diverse faculty members and in leadership positions in industry.

The keynote speaker, Leticia Márquez-Magaña, kicked off the conference by addressing the very issues that motivated the larger themes and goals of the workshop. As she stated, many myths unfortunately still exist that suggest that underrepresented students are less capable of thriving in a STEM environment, also known as the student deficit model. These myths include that they have a lack of interest or motivation for science, they perform more poorly in academics, amongst many others. It was suggested that we move from the student deficit model to an institutional deficit model where more needs to be provided to create an equal playing field where all students can succeed. Moreover, data shows that more diverse teams result in better and more creative problem solving skills. Individuals in the STEM community recognize that more studies are needed to prove the benefits of diverse teams and charges to do so from the NSF and the NIH and the tech community have been announced.

Another large theme that came up multiple times during the workshop was the concept of scientific identity. Attendees discussed how the values of STEM fields do not always align with the values of individuals from underrepresented groups. As a group with the keynote speaker, attendees observed that while highly successful scientists are often motivated by factors like high-impact publishing, funding success, career rewards, and personal reputation, the shared values of, for example, underrepresented groups in STEM and many participants in this workshop, were “giving back” and advancing knowledge to help society. This suggested that underrepresented individuals might have intrinsically different or additional motivations for pursuing STEM careers.

Career development was also an important component of the workshop. Most attendees were early career scientists thinking about the transition from graduate school or a postdoctoral fellowship to a full-time position in academia, industry, or a non-research career. Speakers provided practical advice on how to find a job that satisfies one’s values and addressed the diversity landscape in industry. In regards to individuals from underrepresented backgrounds, there is often a disconnect between personal values and workplace values. Given that emotions drive every decision that humans make, both Charlotta Carter, speaking about tech careers, and Michael Penn, speaking about his own path through academia, medicine, and biotech, advised following one’s natural inclinations when choosing one’s next career move. If you enjoy a certain task, consider building a career around that task and vice-versa. In the end, you cannot make any disastrous decisions for your career as each step will take you along your path and when in a negative situation, we have to learn how to manage our threat responses in order to rise above barriers or seek out a better fit.

Nearly all of the speakers recognized that many systems are “broken”, including the tech industry, in regards to effectively creating an inclusive environment. While making change is a slow and arduous process, the positive outlook is that individuals are taking measures to start creating change. As companies are creating more inclusive environments, it is important to recognize which ones are best at doing so. Some key indicators are if the top-level executive supports diversity and inclusion, whether there is hiring of diverse leaders, whether the company supports diversity ambassador positions, and if diversity is positively changing over time.

Another interesting notion that came up via Charlotta Carter is that the pipeline is not the problem. In other words, there are plenty of talented individuals from diverse backgrounds that are seeking employment. Rather than widening their search net, companies may mistakenly feel like they must “lower the bar” to increase their diversity.

In other words, a shift in thinking needs to take place in recruiting efforts. Perhaps the most practical advice was how to fit into a culture where one is the sole minority. One has to work hard to make a name for oneself, make connections with executive levels in the company, voice how they are feeling, and champion to bring in individuals like themselves to the company. This is in fact a tall order but if collectively individuals can work to do so, then the face and culture of a company will change.

Throughout the workshop, and explicitly on the second day, the attendees recognized the issues above and discussed how to translate them into solutions. The keynote speakers, Leticia Márquez-Magaña and Sheree Marlowe, presented strong and effective solutions to improve the STEM climate, from individual strategies to large institutional programs. Moderated by Lisa Walker, a panel of trainee perspectives at the undergraduate, graduate, and postdoctoral levels highlighted actions taken by underrepresented individuals to address personal challenges in the STEM space. Panelists discussed their own experiences with discrimination and how they overcame them either through personal actions, through their institution, or through programming.

In addition, we invited Expanding Potential seed project awardees to share their excellent diversity and inclusion projects through presentations and workshops. Registrants submitted abstracts describing their own efforts and were selected to give talks and posters. Some examples included a campus-wide diversity training program, a course on data diversity, techniques for recognizing and responding to microaggressions, and seeking out peer groups, friends, and family for support. To help scale and sustain these efforts, we created space for these presenters to interact with the attendees through a table presentation lunch, a poster session/networking reception, or workshops. It is our hope that the Expanding Potential workshop attendees can adopt, scale, and sustain some of these programs and strategies to demonstrate their effectiveness in order for the successful initiatives (through evaluation and assessment) to become institutional policy.

Overall, the Expanding Potential workshop created a safe space to honestly share with like-minded individuals and establish a new standard for how individuals are treated in STEM professional environments, whether it is academia, industry, or another professional organization. Below we summarize specific outcomes and why the Expanding Potential program is important to continue the momentum.

Value and Outcomes:

Expanding Potential's value to the STEM community:

1. Expanding Potential brings together a critical mass of researchers and professionals to more comprehensively explore why certain populations are underrepresented in STEM and develop effective solutions.
2. Expanding Potential brings diversity and STEM professionals across the nation together to share best practices and develop shared mechanisms to sustain, scale, and assess individual programs.
3. Expanding Potential connects underrepresented individuals to program developers in order to create programs that address the real challenges to underrepresented people.

Major conclusions from the Expanding Potential 2016 Workshop:

1. **We need to share the data on diversity.** Until STEM professionals are exposed to this research, they cannot fully appreciate the depth of the problem and

- effective means for creating inclusive and diverse workplaces. Creating workplaces with empathy for all is the right thing to do, period. However, some individuals continue to question whether diversity really benefits STEM fields and require proof of the importance of diversity. We need to acquaint all STEM researchers with this body of work. Underrepresented groups are not aware of this research and are often bombarded with incorrect information and myths that continue to oppress them in their environment. By educating all individuals in STEM, they can begin to internally change hearts and minds about the importance of diversity and inclusion with hard, irrefutable evidence.
2. **We can tap into diverse communities to create solutions.** Individuals that feel underrepresented in STEM are developing creative and innovative solutions, both on a personal basis and more formally, that need to be shared. We observed that by bringing these individuals together, we are able to create a groundswell of energy to share best practices amongst different institutions. By understanding multiple individual strategies to employ, attendees return to their home institutions and feel more empowered. For programmatic strategies, individuals are connected to researchers that conduct evaluation and assessment that will give validity to their program. In addition, instead of the program being a one-off effort, other attendees can adopt the program as well. This will create a scalable approach that proves to be effective that can eventually become institutional policy.
 3. **A community for diversity enhances everybody's effort.** Underrepresented groups in STEM often lack a community due to so few being at one university or department. Attendees were amongst like-minded individuals that could relate to their experiences and were open to learning more about each other's environments. This results in a motivation that they together can create change. No one likes to feel like they are an "other" or don't belong. Through this workshop, attendees can turn to each other during these times of exclusivity. The workshop is a first step to create community and will continue to connect these and more people together.

Survey Analysis:

The Expanding Potential 2016 Workshop (hereafter referred to as EP16) attracted a total of 123 attendees. This includes the organizers, steering committee, volunteers, invited speakers, seed project awardees, and sponsors. We attribute the drop in attendance (123 versus 186 attendees) from the previous Expanding Potential 2014 Workshop (hereafter referred to as EP14) to several factors. These include the increase from one day to two days (however, we acknowledge that registrants could select to only attend one day), the increase in cost (EP14 was offered for free whereas EP16 costed \$20/day or \$30/both days), the change in topic (moving beyond the focus of solely women in STEM), and the time of year (mid-November versus late January). From discussions between the organizers and steering committee and hearing from attendees, we believe that two full days over a weekend and the cost were the most influential factors.

Of the 123 attendees, 50 responded to the survey (a response rate of ~40%). As noted, some responses are from a subset of these 50 respondents as they either did not answer or did not attend the particular session of the workshop. Open-ended responses had a lower response rate as to be expected. No demographic data was collected on survey respondents in order to keep answers as anonymous as possible. When analyzing the results, any additional possible identifiers were removed.

We asked general questions about the overall workshop as listed in the table below. To the question “Overall, how would you rate the workshop?”, 47 out of 50 respondents rated the workshop as excellent or very good (Table 1). No respondents listed it as not good or poor and only 1 respondent listed it as okay. Interestingly, we find that the workshop had a significant impact on the way individuals think about diversity and inclusion in STEM and influencing them to create a more inclusive environment (Table 1). 16 respondents strongly agree and 24 respondents somewhat agree that they have changed the way they think about diversity and inclusion in STEM. Equally exciting is that 33 respondents strongly agree and 9 respondents somewhat agree to being influenced to want to take more action to create a more inclusive STEM environment. Given this result, the goal to create a groundswell for awareness of challenges to underrepresented groups and solutions to these challenges will likely lead to results at individual institutions due to the workshop.

To better demonstrate action taken, several respondents have agreed to submit reflections or action-oriented statements demonstrating more concrete examples of how this is taking place. This will be available on the Expanding Potential Reflections page (<https://www.synberc.org/expanding-potential-reflections>). Additionally, we will ask all attendees to respond to another survey in 6 months to a year to identify any change in attitude, any actions taken, and any additional outcomes due to the workshop.

In regards to the length of the event, overall it was a bit too long for attendees (Table 1). We acknowledge that the length of the event can be shortened and will work towards creating a more feasible time frame for individuals to commit to attend the workshop. One example is to only offer the poster session/reception on one day and thus, cut down one day to half of a day and to hold the workshop on one weekday and one weekend day for those with weekend obligations.

Table 1: Survey responses to overall workshop rating, a change in thought, an influence to take action, and the overall length of the workshop. Scales as indicated in the responses for each question or prompt.

123 attendees, 50 total respondents							
Overall, how would you rate the workshop?		The workshop has changed the way that I think about diversity and inclusion in STEM.		The workshop has influenced my wanting to take more action to create a more inclusive STEM environment.		Was the event the right length?	
Average	5.34	Average	6.06	Average	6.38	Average	4.62
Std Dev	0.66	Std Dev	0.84	Std Dev	1.14	Std Dev	0.90
Excellent (6)	21	Strongly agree (7)	16	Strongly agree (7)	33	Much too long (7)	2

Very good	26	Somewhat agree	24	Somewhat agree	9	Somewhat too long	8
Good	2	Slightly agree	7	Slightly agree	5	Slightly too long	9
Okay	1	Neutral	3	Neutral	2	About right	31
Not good	0	Slightly disagree	0	Slightly disagree	0	Slightly too short	0
Very poor (1)	0	Somewhat disagree	0	Somewhat disagree	0	Somewhat too short	0
Total respondents to question	50	Strongly disagree (1)	0	Strongly disagree (1)	1	Much too short (1)	0
		Total respondents to question	50	Total respondents to question	50	Total respondents to question	50

To dig deeper into “The workshop has changed the way that I think about diversity and inclusion in STEM.” and “The workshop has influenced my wanting to take more action to create a more inclusive STEM environment.”, we asked two open-ended questions: “Can you provide some examples as to how you think of the issues differently?” and “What actions do you plan to take to create a more inclusive environment due to this workshop?”.

Qualitatively looking at the write-in responses, we find that people changed their way of thinking by the following categories (each response was counted with redundant responses eliminated):

New knowledge

- learning about the great variety of underrepresented groups
- the vast variety of issues faced by underrepresented groups
- subtle forms of discrimination

Empathetic thought

- considering and learning from new perspectives
- the importance of empathetic thinking
- learning how to frame a conversation on the issues
- the importance of experiential-focused projects
- recognizing the value of each individual’s experience
- using the information presented and apply it to their own experiences
- shifting our thinking away from an student deficit model to an institutional deficit model (in other words, focus on fixing the institution and not the student, see workshop summary)

Methods for solutions

- the need for multiple solutions to create a true change in climate
- the plethora of programming and the idea that each individual can make a difference
- the importance of institutional buy in in addition to starting with the individual
- the importance of retention versus hiring

Research

- the benefit for STEM itself
- the importance of social science research and data on these topics to drive change
- considering root causes of underrepresentation
- the importance of evaluating programs
- STEM individuals being involved in social science research

Resources

- the need for resources for programmatic efforts
- the tools and strategies available to create an inclusive environment
- the differences in support based on the institutional focus

Categorized actions that individuals stated that they would take are (many of the responses can fit multiple categories – each response was used once, with repetitive responses eliminated, and put into the category of best fit):

Self-reflection:

- start considering new points of view
- conduct more self-reflection
- address own biases
- become more empathetic individuals
- becoming an ally to disadvantaged groups
- educating themselves more deeply
- seeking out non-white media

Intervention:

- more awareness to unconscious bias and microaggressions
- be more reactionary to microaggressions
- intervene when individuals are being exclusive
- use more sensitive wording on websites

Seed project growth:

- scale a seed project to their own institution
- start own PopUp Museum
- have Unconscious Bias training for own departments
- use the work of the Unconscious Bias Project to inform decisions, projects, and initiatives
- joining the Unconscious Bias Project

New initiatives:

- create a monetary diversity award
- publishing a monthly newsletter for a diversity group
- increase web presence of diversity group
- diversity workshop or event at yearly meeting of professional society
- write proposals for diversity initiatives

Mentorship:

- create a more inclusive environment for mentees
- start a mentoring program

Classroom sensitivity:

- be more sensitive to other individual's needs and learning styles
- incorporate activities to support diverse students in the classroom
- incorporate activities to support diverse students on campus
- talking to students about stereotype threat

Building an inclusive community:

- create community building events that have equity and inclusion built into them
- building internal inclusive working teams
- make programs and conferences more diverse and inclusive
- survey own community for needs
- addressing socioeconomically underserved populations

Becoming a part of an existing community:

- taking on more outreach activities
- publicizing outreach activities more
- join groups that work to increase diversity in STEM
- send own research members to Expanding Potential
- seeking out additional workshops, resources, and conversations

Sharing resources:

- sharing and recommending resources
- sharing departmental climate surveys

Continuing conversation:

- initiating dialogues
- discuss issues with faculty colleagues
- suggesting incremental changes
- propose programming at departmental town halls
- sharing experiences from the workshop to individuals in their department
- continuing to discuss diversity and inclusion issues when presenting research in other venues

When asking why individuals changed their way of thinking and why they wanted to take action, the overall sentiment was that the workshop opened their eyes to the depth of diversity and inclusion issues that go beyond what they had been previously exposed to. That in addition to the enthusiasm, energy, and intelligence of all of the speakers set the stage to inspire the attendees. Below are responses that demonstrate this:

I was mostly aware of the general, overarching types of adversity that underrepresented minorities face in STEM - the basic systemic issues that have been defined/identified - and was supportive of progressive change, but the Expanding Potential workshop helped clarify and solidify many aspects. The testimonials that came across in presentations were at once humbling and emboldening.

Diversity and inclusion in STEM were already on my radar. However, attending the workshop, focusing on the issues, and hearing from so many inspirational people has renewed my personal commitment.

I realized that I can think more flexibly about what I can work on to help change the culture at my institution, and that I can think more flexibly about what I do in my classroom.

I became more aware of the programs and incentives in place to improve diversity and the experience of under-represented groups in our country and even on my own campus [sic]. I came away with the feeling that solutions to disparities in STEM fields are really gaining momentum, rather than languishing as unenforced policies and statements. It was energizing and inspiring to witness. I especially appreciated the keynote speaker's data-driven ideology and solution-oriented approach.

Specifically, some of the data presented on gender disparities on intent to pursue academic careers in STEM after beginning graduate school stopped me in my tracks. I had considered my own choice to pursue a non-academic career a purely personal decision but was forced to admit that this was perhaps in part a product of institutional disincentive [sic] of this option for women. It made me think about how I will discuss my choice in the future, especially with other women and students from other underrepresented social groups in STEM. I was also inspired by the degree of change individuals were able to stimulate in their own communities; I realize I have a lot more to give of myself that could cause concrete changes in my field.

I personally didn't think I could [sic] make a change but after the workshop I understand and believe that every single one of us can do something to change the status quo.

It was just really inspiring to hear from everyone who is trying to make a difference and I want to be part of that.

Talking to so many people who are so passionate about these issues has added fuel to the fire in my mind.

It seems like there is hope, based on what people have done, to increase diversity, rather than this being a hopeless task.

We also surveyed if the various speakers and sessions of the workshop were useful/informative on a scale of 1 to 10 with 10 being most useful/informative. Overall, all of the speakers and session rated higher than average (Table 2 applies to all results below).

On the first day, the keynote speaker, Leticia Márquez-Magaña, that gave an overarching state of the field with data and studies and included an effort of her own rated an average of 9.33 +/- 1.27 from 43 respondents. The panel of trainee perspectives moderated by Lisa Walker received an 8.00 +/- 2.17 from 43 respondents. This panel included undergraduate and graduate students and postdoctoral fellows (2 of each) that spoke about challenges they faced and solutions they implement on an individual basis or through participating in several organizations/activities. The roundtable lunch activity proved to be useful rating 7.56 +/- 1.87 from 41 respondents. This activity included prompts on each table consisting of 3 questions:

- How are your challenges and experiences with STEM similar or different from the panel?
- What have you found that worked as you deal with those challenges?
- What questions do you still have? What are we missing?

These questions aligned with the introductions of the panelists (the session prior to lunch). From observation, many attendees did not necessarily need the prompts to generate conversation. In addition, we did not provide a discussion leader at each table. Given the general “buzz” during the lunch, participants appeared to be having in-depth discussions centered on the keynote and panel. In the afternoon, the industry perspectives speaker, Charlotta Carter, conducted a more general question and answer session and rated a 6.45 +/- 2.34 from 42 respondents. The final speaker, Michael Penn, co-created a talk with attendees on career development, receiving a rating of 8.02 +/- 2.13 from 43 respondents.

On the second day, the keynote speaker, Sheree Marlowe, spoke about the many programs at the University of California, Santa Cruz that are creating a more inclusive climate for the campus. We thought it important to include an individual that is not STEM-focused in order to learn from a different perspective. This proved to be beneficial as 40 responses resulted in a rating of 8.60 +/- 1.53. The selected lightning talks from abstract submissions and seed project awardee lightning talks rated very useful/informative (8.85 +/- 1.26, 41 respondents and 9.07 +/- 1.07, 42 respondents, respectively). This likely reflects the call from the previous workshop for more action. Expanding on this, the workshop provided new, more in-depth spaces to discuss the projects presented during the lightning talks. The selected lightning talks were required to present a poster at poster sessions and a networking reception each day of the workshop. The poster sessions received a rating of 8.47 +/- 1.27. The seed project awardees were provided with one-hour workshop slots with the purpose of scaling each individual’s program (overlapping for the sake of time), which received an overall rating of 8.86 +/- 1.17. Finally, we held a networking lunch that included tables for sponsors and the selected lightning talks to more intimately interact with attendees. This received an 8.39 +/- 1.92 rating. This served dual purposes – provide yet another space for scaling programs and also to allow for an opportunity for career development.

Table 2: Survey responses to speakers and sessions (on a scale from 1 to 10 with 10 being most useful/informative).

	Keynote Speaker on Day 1: Leticia Márquez-Magaña	Panel of trainee perspectives: Moderated by Lisa Walker	Roundtable Lunch Activity
Average	9.33	8.00	7.56
Std Dev	1.27	2.17	1.87
Total respondents to question	43	43	41

	Industry Perspectives Speaker: Charlotta Carter	Career Development Perspectives Speaker: Michael L. Penn, Jr.	Keynote Speaker on Day 2: Sheree Marlowe
Average	6.45	8.02	8.60
Std Dev	2.34	2.13	1.53
Total respondents to question	42	43	40
	Selected Lightning Talks	Seed Project Awardee Lightning Talks	Networking Lunch
Average	8.85	9.07	8.39
Std Dev	1.26	1.07	1.92
Total respondents to question	41	42	38
	Workshops for Seed Project Awardees	Poster Sessions	
Average	8.86	8.47	
Std Dev	1.17	1.27	
Total respondents to question	35	38	

Quotes and Testimonials:

Several attendees provided quotes or testimonials non-anonymously about their experience at the workshop:

Leticia Márquez-Magaña, Professor, San Francisco State University (Day 1 Keynote speaker): *I was inspired by the young scientists who attended the conference. Their outrage at the status quo and committed efforts to elicit change engender hope for the future of science.*

Sheree Marlowe, Campus Diversity Officer for Staff and Students, University of California Santa Cruz (Day 2 Keynote speaker): *This workshop was powerful and engaging. It was an honor to speak at this event to discuss the broader areas of diversity and solutions-programs and initiatives-that have proven to be successful in creating change. Too often we have a silo mentality when we approach to this work. There are intersections in diversity work. It is essential to utilize data, research, and lived experiences to leverage and prioritize institutional change and action to improve the campus climate.*

Alyssa Rosenbloom, Postdoctoral Fellow, University of California Berkeley (Panel participant): *As I looked out over the audience, I was struck by the beauty of our differences and the unity of our purpose; to increase equality in science.*

Tanya Smith, Associate Professor, Harvard University (Selected abstract speaker): *The Expanding Potential Workshop was an inspiring and informative event. I was particularly impressed with the dynamic and innovative structure of the program and the keynote talks by campus leaders and change agents. The genuine enthusiasm, courage and commitment of all the participants underscored why embracing diversity is critical to the future of academia.*

Nathan Hillson, Director of Synthetic Biology, Joint BioEnergy Institute (Attendee): *I really enjoyed and benefited from Synberc's Expanding Potential 2016 Workshop, and I was proud that Berkeley Lab and the Joint BioEnergy Institute participated as co-sponsors. Perhaps the most memorable session for me was the undergrad/grad/postdoc round table in which the panelists shared their experiences - it was eye opening for me. The event also happened to be the first time I experienced a gender-neutral washroom configuration, and I was very interested to see that Ivan Coyote presented on this topic at a recent TED talk event.*

We will provide future developments on our website based on this analysis as we continue to sustain and grow the Expanding Potential program.