

CC-PES Final Year Report

REFLECTIONS ON CO-CREATION, PES, AND COMMUNITY ENGAGEMENT
AT THE MUSEUM OF SCIENCE

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Our thanks go out to the MOS staff who provided their thoughts on community engagement work at MOS and the meaning of co-creation.

Photos:

All photos are by the Museum of Science Boston unless otherwise noted.

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INTRODUCTION

In 2018, the Museum of Science, Boston (MOS) kicked off an initiative called CC-PES: Building Capacity for Co-Created Public Engagement with Science. Funded by the National Science Foundation's Advancing Informal STEM Learning award (AISL), this project set out to test a model for bringing museums and other informal science education institutions (ISEs) together with community and civic partners to create programs that address critical socio-scientific issues in a manner that promotes civil dialog amongst diverse stakeholders. These issues include topics such as climate change, vaccinations, and any other problem that lives at the intersection of science, policy, and human values. Between 2019 and 2023, twelve different teams, each led by a museum partner, tested the CC-PES project model (see Figures 1 and 2) in collaboration with local civic and community organizations. Findings from these earlier phases of the projects can be found in the Phase I, II, and III reports.¹

In the final project year, the Museum of Science used lessons learned from these earlier phases and explored different approaches to co-creation across a wide range of initiatives within this single institution. External researcher partner Rockman et al Cooperative focused on the question, “What does it look like for a large informal science education institution - with many different departments, staff members, initiatives, and priorities - to move toward a more community-centric approach?” This report presents findings from interviews with MOS staff as they reflected on this question, their interpretations of co-creation, and the shifts they have seen in how MOS approaches its work with communities.

Table 1. Project Definitions

Informal Science Education (ISE)	Used here to refer to museums and other similar institutions that provide science education programming in a non-school context
Public Engagement with Science (PES)	An approach to informal science education that places value on multiple forms of expertise when addressing scientific questions with social significance and impact. In addition to scientific expertise, PES stresses the importance of lived experience and other forms of knowledge. PES strives for mutual learning between scientists and the public and collaborative decision making that takes into account the information, values, and ethics brought by different groups. ²
Forum	A community dialog program that addresses current socio-scientific issues. Past examples from MOS explored questions like, “Should we genetically engineer mosquitos to eradicate malaria?” and “Should we allow autonomous driving vehicles?” The goal of these programs is to promote civil conversations between individuals with diverse expertise and positioning, in order to reduce polarization and lead to better decisions.

¹ Quimby, C., Sanford-Dolly, C., Fedje, K. (2021-23). Co-Created Public Engagement with Science: Phase I/II/III Report. Rockman et al Cooperative. <https://www.nisenet.org/catalog/co-created-public-engagement-science-cc-pes-project-reports>

² Kollmann, E. K., Reich, C., Bell, L., & Goss, J. (2013). Tackling Tough Topics: Using Socio-Scientific Issues to Help Museum Visitors Participate in Democratic Dialogue and Increase Their Understandings of Current Science and Technology. *The Journal of Museum Education*, 38(2), 174–186. <http://www.jstor.org/stable/43304981>

Figure 2. CC-PES Model

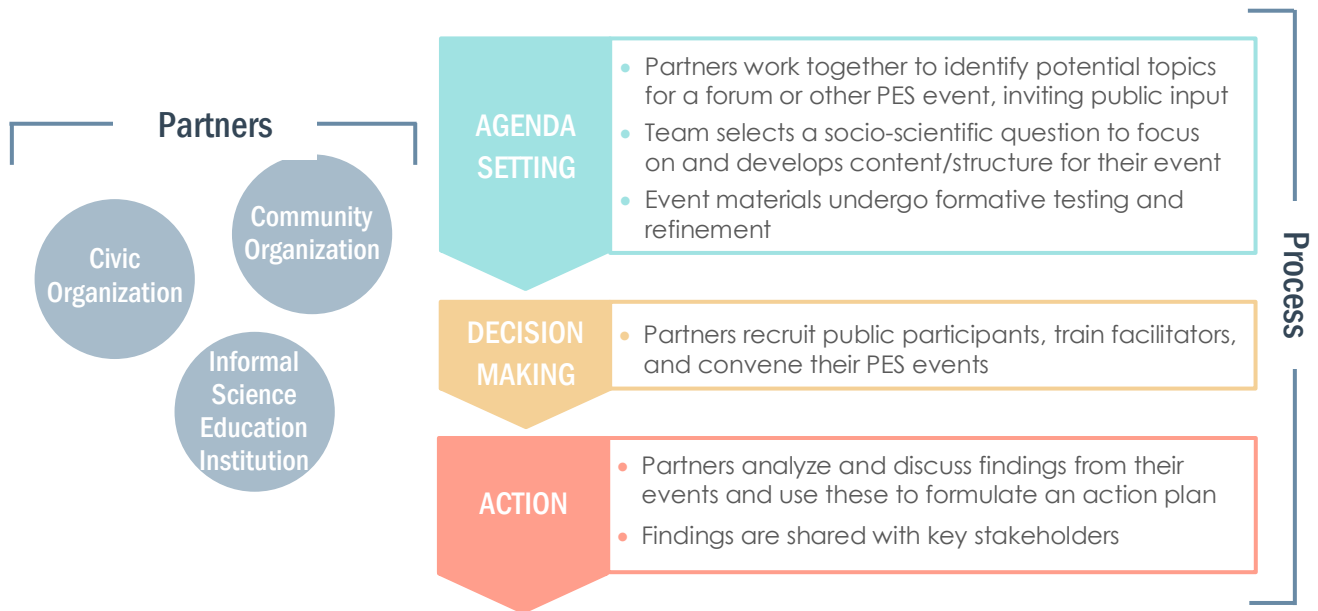
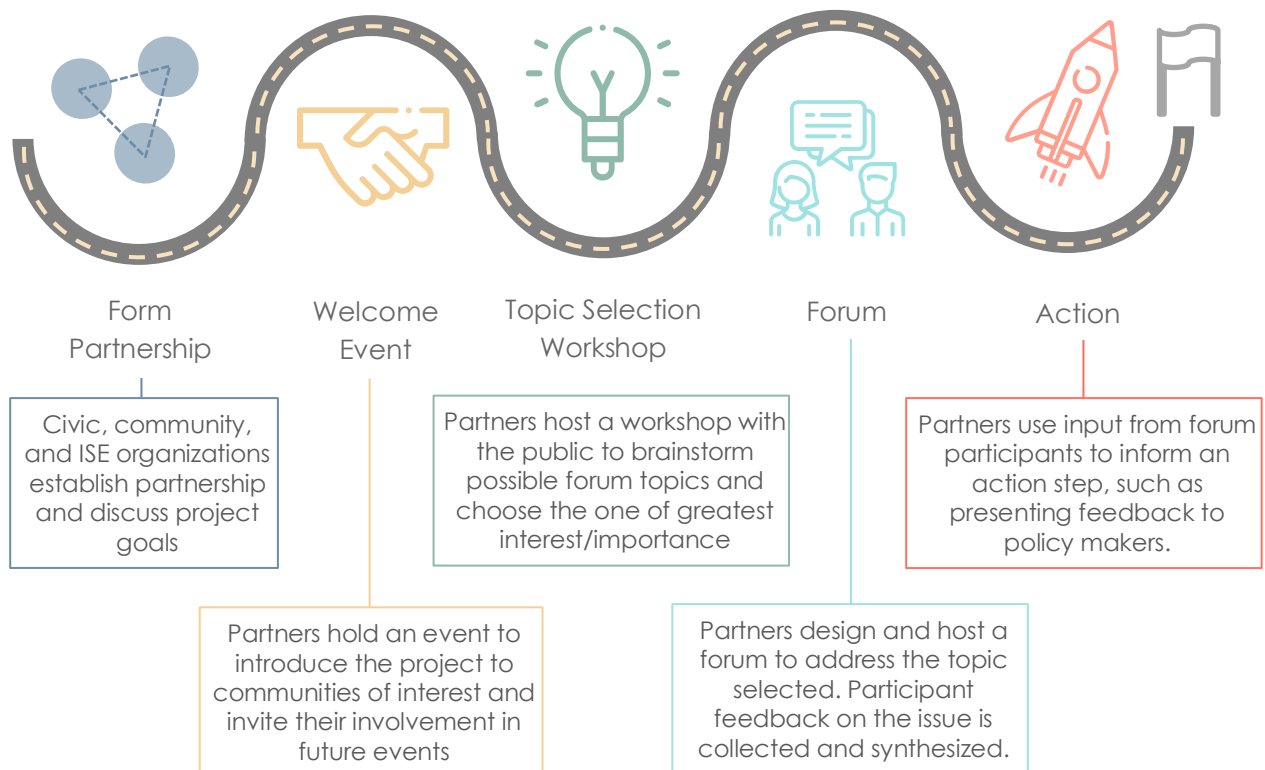


Figure 2. CC-PES Project Roadmap



Evolution of the CC-PES Project

The Museum of Science has been a pioneer among ISEs in its forum programs that address socio-scientific issues, inviting audiences (typically adults) to engage in conversations about science, values, and how policy decisions should weigh these. For example, earlier work by MOS under the Multi-Site Public Engagement with Science project (MSPES), resulted in forums on synthetic biology and gene editing, asking participants to weigh the pros and cons of genetically modified foods or combatting malaria by changing the DNA of mosquitos. Forum programs were again the central initiative of the CC-PES project, and MOS innovated on their prior work in two key ways: 1) by inviting community and civic partners to be co-creators alongside ISEs in the forum development process, and 2) by inviting the public to identify the socio-scientific issues that these forums should focus on, selecting the topics of greatest relevance to their own lives.

All of museums involved in the first two project phases (MOS, the Oregon Museum of Science and Industry in Portland, and the Museum of Life and Science in Durham, NC) were familiar with forums as defined by the project (see definitions, Table 1), thanks to the earlier work done by the National Informal STEM Education Network (NISE Net) and by MOS. The partners involved in the third project phase were also largely familiar with forums as a mode of public programming for museums. These museums did not, however, have extensive experience engaging in co-creation partnerships with civic and community organizations. As the project progressed, figuring out how to successfully develop these relationships and collaborate effectively took precedence over following a specific model or style of program. The Phase I teams in Boston and Portland, followed the proposed project roadmap from the initial CC-PES proposal closely. The Phase II team and most of the Phase III teams ended up adapting the roadmap to fit the needs of their particular partners, their existing programs, their goals, and the resources available. The Durham team, for example, incorporated multiple listening sessions into their forum development process, to ensure their resulting program was closely aligned with the perspective of the audience with whom they were collaborating. Another team's culminating event functioned more as a convening or networking opportunity between like-minded organizations, which laid the groundwork for future collaborations. A third team organized a design workshop with students and teachers to envision future uses for a shared community space. Each team was learning important lessons about how best to work together with their community and civic partners, and flexing the model to fit. In their final reflection interviews, Cohort 3 museum staff noted that while it was helpful to have the CC-PES model and roadmap as guidance, they also appreciated being able to adapt the process to their unique situations. Too much external directive, one individual noted, could prevent the project from feeling authentically co-created.

As the CC-PES project progressed, the questions it was eliciting began to shift. The teams, project leadership, and research partner at Rockman et al began to focus less on the challenges and successes of CC-PES model and more on the meaning of co-creation, how to establish meaningful and authentic community partnerships, and the role of museums in lifting up the voices of marginalized groups or tackling complex social issues like affordable housing or food access and security. The COVID-19 pandemic, Black Lives Matter movement, and workplace stresses and upheavals had teams questioning the requests they placed on their partners, who

were often community organizations providing vital services to marginalized groups. Museums have been questioning the ways they do or don't serve diverse audiences for years, and these concerns were amplified in the early 2020s and in discussions surrounding the CC-PES project, thanks to its focus on engaging the public more directly in museum program development and on tackling important socio-scientific issues.

Looking In and Scaling Up

During the final project year, the CC-PES grant was used to support a number of initiatives across MOS, each which involved different kinds and degrees of community involvement. The project didn't dictate the use of the model or any particular form of community engagement, but allowed each initiative to proceed according to its individual goals, the existing relationships and work perspectives of the team members and partners involved and any resources and constraints that accompanied the work. From a research perspective, the project team was interested to see what new lessons about co-creation and public engagement with science could be learned from taking on these kinds of initiatives at an institution-wide scale. From December 2023 through April 2024, an REA researcher conducted interviews with key MOS staff involved in these community-focused projects to learn more about how they approached their work, their perspectives on co-creation and working with community partners, and what it means for MOS as an institution to pursue and support co-creation work.

What emerged from these conversations were rich discussions about how staff members feel about their work with communities – when the work feels authentic and meaningful, and when it feels shallower or hampered by external constraints or competing values. MOS staff also reflected on the journey of the institution from more traditional “museum as expert” approaches to new and exciting ways of putting diverse audiences in the driver's seat. They highlighted how the CC-PES project team as well as museum leadership have driven some of these changes, but also how single staff members have been instrumental. They talked about structures and attitudes that they feel are holding the work back or creating uncertainty about where the museum is headed in its approach to working with communities. They also discussed how different frameworks – including co-creation and PES – influence their work. Their descriptions of these terms paint a complex diagram of overlapping values and intentions – the ideas that underpin how these staff want their work in museums to make meaningful contributions in a world beset with many inequities and complex challenges.

The interviews reported here represent a convenience sample of staff who expressed enthusiasm about the potential of community engagement work at MOS and aligned with the philosophies of co-creation and public engagement with science. Staff in departments that traditionally engage less with communities and staff who may have less familiarity with co-creation and PES did not respond to interview requests. As a result, there are certainly gaps in the story presented in this report, including the nuances of how other teams and departments think about MOS communities and the opportunities and challenges for co-creation projects. We hope this report can be a starting point for those conversations at MOS and other institutions.

Table 2. CC-PES Final Year - External Evaluation Design

Research Questions

- What does it look like for a large informal science education institution - with many different departments, staff members, initiatives, and priorities - to move toward a more community-centric approach?
- How do staff describe and understand co-creation? What are the different values, frameworks, or habits that staff are bringing to their work with communities?
- Do staff perceive their work as being co-created with their partners, or do they describe it in other ways?
- Where are people encountering successes or challenges in this work?
- What support do staff need to engage in co-creation with community partners?
- How does a model like CC-PES serve MOS? Where are the gaps, and what modifications or other models are needed?

Methods

Semi-structured interviews with eleven MOS staff members involved in community engagement work

GROWTH AND CHANGE AT MOS: SHIFTING TOWARD MORE COMMUNITY-CENTRIC APPROACHES

Collaborating with outside organizations is not a new practice for the Museum of Science, but staff sense that there has been a definite shift in recent years in the kinds of partnerships the museum is pursuing and the ideologies behind the work. Overall, staff described a positive change, citing collaborations with new kinds of partners, welcoming more diverse perspectives and forms of expertise, and breaking down internal silos that had been a barrier to deeper work with communities.

One staff member reflecting back noted that the term co-creation didn't seem to be an accurate description of most of the museum's partnerships in the 70s, 80s, and 90s. The museum might borrow exhibits from other institutions or host an artist in residence, "but I don't think we co-created with them in any way," they noted. Certain projects contained elements of co-creation, such as a collaboration with the Harvard Peabody Museum in which the two institutions shared their resources and skills and collaboratively decided on the project's direction. The museum also undertook similar projects with universities in the Boston area. Still, this staff member noted that there were different ideas behind the work at that time. For one, they cited less openness to the expertise and input of outside partners. "I have to say that much of the time, there was kind of this feeling that the Museum of Science knew how to do what it wanted to do, and other people did not," they stated.

Furthermore, the *kinds* of partners MOS collaborated with in decades past were different than those described in this report. MOS might have partnered with universities and museums – institutions with fairly similar values and social capital – but partnerships with community organizations were less common. One exception were the monthly ethnic programs that MOS developed with community partners such as the Boylston Schul-Verein (a German American Club, www.germanclub.org) or the Greater Boston Chinese Cultural Association (gbcca.org) in the 1970s.

The idea that the public – not just academics, museum professionals, or other traditional forms of experts – should have a voice in MOS programming beyond the occasional cultural event did not emerge in a major way until the late 1990s/early 2000s. Describing this moment in time, an MOS staff member talked about a growing awareness that certain problems at the intersection of science and society required input from individuals and communities affected by these problems. One example of this was an interactive museum theater piece called *Mapping the Soul* that focused on the Human Genome Project.³ During the program, actors would pause to ask museum visitors introspective questions, such, "Would you want to know your genetic information?" David Sittenfeld and Larry Bell (CC-PES Pls), was also a pioneer in promoting PES at the museum through forums developed for the National Informal STEM Education Network (NISE Net). In forums such as "Energy Challenges, Nanotech Solutions?" participants were provided with background information on the science topic at hand before being asked to discuss hypothetical questions involving the practical application of the science. Participants would

³ Hughes, C. (1998). Theater and Controversy in Museums. *The Journal of Museum Education*, 23(3), 13-15.

take part in small group conversations to share their thoughts on the scenario at hand, working through both the scientific information and discussing the interwoven human impacts and values. These kinds of dialog events have become a mainstay of Museum of Science programming and the central element of previous grant-funded work, like the Multi-site Public Engagement with Science project (MSPES). They have provided one avenue for MOS to address current issues, engaging the public in discussions about climate change, vaccines, and hydrogen power.

In a 2013 article describing these forums, MOS staff note that they were initially motivated by a desire to better educate the public about scientific topics so that individuals could make more informed decisions and arguments when it came to related policy issues.⁴ After a time, however, ISEs became more aware that they had something to learn from their visitors as well. Kollmann et al. describe the growing understanding of the “unique expertise that visitors bring” to socio-scientific issues, and the need to recognize this expertise in order to support “democratic dialog” around important problems facing society.

The CC-PES project (which kicked off in 2018) and the accompanying conversation about co-creation represents a step further in considering the relationships between MOS and its communities. The CC-PES project was motivated in part by the following ideals: to “reduce polarization about socio-scientific issues, give people a greater voice in science, and address barriers that disconnect scientists from publics.”⁵ Unlike prior forums developed by ISEs, the forums in the CC-PES project would focus on topics selected by the public, allowing their voices to determine which issues to elevate. Furthermore, the CC-PES project would use a co-creation approach, where civic and community organizations would work alongside their museum partners from the first steps of the roadmap (see Figure 2) through to the end. The work of these partners over the past six years has resulted in a stimulating conversation about the meaning of co-creation and how museums can develop authentic collaborations with community and civic partners.

These conversations at MOS are also being propelled by other forces from within the museum and from without. One staff member called attention to the murder of George Floyd and the resulting impact this and the Black Lives Matter movement had on the museum community. These events amplified important discussions about museums audiences that had existed previously but now had new urgency and greater recognition: How are museums serving their communities, welcoming diverse audiences, and bringing their voices into museum programs? This staff member credits that moment in time as accelerating this dialog at MOS – a conversation which is still going strong:

“In the last five years, I definitely hear a lot more about co-creation and collaboration, bringing in outside work. I do see that shift happening. I think it’s accelerating... I’m excited to see what the next few years bring for institutions, and I’m just glad the conversations are happening.”

⁴ Kollmann, E. K., Reich, C., Bell, L., & Goss, J. (2013). Tackling Tough Topics: Using Socio-Scientific Issues to Help Museum Visitors Participate in Democratic Dialogue and Increase Their Understandings of Current Science and Technology. *The Journal of Museum Education*, 38(2), 174–186. <http://www.jstor.org/stable/43304981>

⁵ Museum of Science, Boston. (2018). Building Capacity for Co-Created Public Engagement with Science. Grant proposal narrative to the National Science Foundation Advancing Informal STEM Learning program.

Since COVID, really, you know, and really George Floyd and everything that happened - I know that was an eye opener for so many institutions across the country, but for us it hasn't slowed down. I think that that's what's really hopeful for me - that it wasn't just in that moment. And for that year that we really said we want to bring in community voices. It's only increased, and it's only sort of being driven more here at the museum.

These events also roughly coincided with the beginning of Tim Ritchie's tenure as president of the museum. Ritchie joined MOS in January of 2020, and several staff members cited his influence as having an impact on the way MOS approaches its community work. One individual described the shift as moving the museum from a more content-focused perspective to a greater focus on community. Another staff member spoke about leaving behind more traditional, top-down educational approaches with the museum positioned as the expert, to one that invites more public input. A third cited Ritchie's emphasis on MOS being a "space for everyone," welcoming in more community voices. Several interviewees noted that Ritchie's vision for MOS helped take ideas and approaches that Sittenfeld had been promoting for years through the forum programs and spread these across the institution. Many of these values describing how museums should work with their communities are communicated through the new mission/vision/values MOS adopted in 2023 (Figure 4).

"I think when I first came here, there was a small group of people who were really focused on engaging community voices of all kinds and all types in the work that we do. David has always been one of those individuals. And I think with Tim Ritchie coming in and giving people the freedom and to experiment and really putting a stake in the ground of like, we want to be a space for everyone. And it's written into our values. It's written into our mission like we want to create a lifelong love of science in everyone. It has just allowed I think people to really reach reshift the way that they think about creating their work here and bringing in those community voices."

"I definitely feel like we're better about sharing things across the institution. Now, not only topics and themes, but the resources and people and the connections that we're making outside of the museum."

Another major shift introduced by Ritchie was the reorganization of the museum into its current Centers for Public Science Learning in 2022-23. Staff noted that the restructuring of the museum into its three Centers – the Center for Space Sciences, Center for the Environment, and Center for Life Sciences – has reduced the barriers that previously existed between teams and departments. "It has felt like the museum itself has just sort of opened up all of those silos more," one individual stated. Another staff member gave the example of new collaborations between the museum's Advancement team and the Community Engagement team

and other education staff. Funders are increasingly interested in the ways museums are supporting their communities, and input from the Community Engagement team at MOS is now closely tied to the museum's development efforts. Another staff member described it as working more toward common goals, such as the recent Earthshot initiative.

Figure 4. MOS Mission/Vision/Values Statements, 2023
mos.org/about

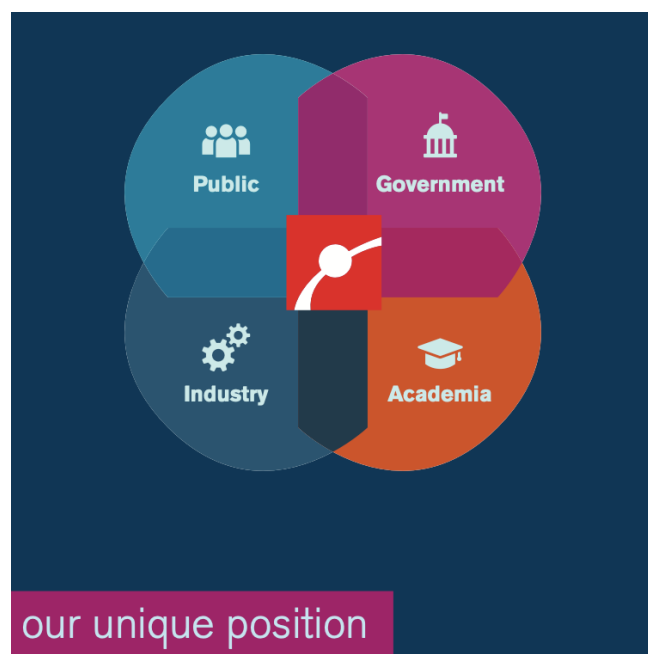
Our Mission
To inspire a lifelong love of science in everyone.

Our Vision
A world where science belongs to each of us for the good of all of us.

Our Values

- **Everyone:** We are everyone's Museum. We pursue equity and celebrate every person for who they are. We foster an inclusive environment in which we value and respect diversity.
- **Service:** We serve our colleagues and community. We hold ourselves accountable to be a trustworthy public resource, and to support a sustainable, just, and evidence-based future.
- **Learning:** We love learning. We are curious about the world and want to share our joy and wonder with others. We value open minds and recognize that everyone has more to explore, discover, and create.
- **Connection:** We find strength in connections. We collaborate across communities, organizations, and disciplines to make science relevant and accessible to all.
- **Boldness:** We dream big. We boldly push ourselves forward, pursuing new ideas and challenges.

Figure 4. Strategy schematic showing four key community partners with MOS as a central connector



Organizational shifts at MOS have also raised questions amongst staff, however, about where community fits into the picture and how community should be defined. Recent communications from the museum have defined four major spheres of community: government, industry, academia, and the public (Figure 4). The idea, staff said in their interviews, is that the museum has the potential to be an important connector at the hub of these spheres, drawing on their latest innovations and most relevant topics of the day and delivering these to audiences via the Centers for Public Learning. In this way, MOS can benefit from the expertise of these sectors and deliver more relevant and “cutting-edge” science than it could if it were working to develop content and programs on its own. This diagram and the accompanying definition of community have been an important tool for advancing a new entrepreneurial strategy at the museum – one that is intended to attract donor funding, increase financial stability, and help the museum perhaps one day remove its admission fee and be free to all visitors.

The problem for some staff is that industry, government, and academic partners all have considerable influence in the world and their expertise has long been recognized by museums. These are not the players that some MOS staff think about when they talk about “community.” Instead, their interview responses focused on smaller, local organizations and marginalized populations – groups that are not clearly represented in the diagram or the strategy surrounding it. Perhaps these groups are meant to occupy the “public” sphere, but scholars have cautioned strongly against using such monolithic and homogeneous terms to describe diverse groups and individuals.⁶ Furthermore, does the Public in this diagram represent a fourth source of expertise, or merely a recipient of programs developed by the other players?

The CC-PES project has specifically advocated for the former, bringing new voices into the dialog about science and society via museum programming, through community partners such as Momentum Alliance in Portland, OR and Families Moving Forward in Durham, NC during the earlier phases of the project. MOS staff have also engaged an exciting new array of community partners during the extension year of the project, described in the examples that follow (p. 18). But what does it mean for museums like MOS to recognize and incorporate the expertise of these groups in a co-created approach? Interviews with MOS staff provide introspection on this question, described in the section below.

⁶ Merriman, N. (Ed.). (2004). *Public Archaeology*. Routledge.

CO-CREATION, PUBLIC ENGAGEMENT WITH SCIENCE, AND COMMUNITY WORK: DEFINITIONS, VALUES, AND APPROACHES

A researcher kicked off the interviews with MOS staff by asking them to talk about their understanding of co-creation and what it means. Most interviewees were hesitant to suggest any sort of concrete definition. “I think I’m comfortable in saying I don’t know what co-creation is. I don’t think anyone knows what co-creation is,” one individual laughed. Nevertheless, many common themes emerged from interviewees’ descriptions of the concept.

“We’ve talked about co-creation as a true decision-making sharing experience... I think we’re trying to move to being more specific about how we define it, and letting the community partner share the power in that relationship in different ways.”

The most common of these was the **importance of power sharing** between museum staff and the individuals or groups with whom the museum was co-creating. There was general consensus that in a co-created project, MOS cedes some level of control in the decision-making process to a partner, beyond asking for their input on a product or program. Just how far the balance of power tips varies from project to project. Some staff described projects or processes where the MOS and its partner organization were making decisions together, for example, in a recent Hispanic & LatinX heritage weekend where MOS collaborated with a local Hispanic

artist to develop a storytelling program. Others described situations where the museum largely stepped back and allowed the partner to drive. The ReRooted/HairStory Project installation in the MOS immersive theater is one example. Artists and ReRooted founders Yvette Modestin and Ana Masacoste created the content for the installation, which was a “multimodal” series of stories about black and brown natural hair and Black and LatinX heritage. MOS in turn provided the space, resources, and production assistance to bring these stories to MOS audiences. Regardless of how specific roles played out, staff emphasized the importance of **giving community partners agency in the process and in the products**.

While staff often held the HairStory Project up as a clear example of co-creation, it raises the question about the roles of partnering organizations. **Does co-creation imply that partners are taking on equal roles and involvement, and if not, what roles should museums and community groups adopt?** If the museum plays a supporting role to a partner that is executing their own vision, is this co-creation? Or instead, does co-creation suggest that the museum and its partners are sharing equally in decision-making around all the various tasks that an exhibit or program might entail? Some staff talked about the latter in their understandings of co-creation. “I think co-creation has a little bit more of both parties having involvement in the day-to-day,” one individual reflected. In earlier phases of the CC-PES project, however, team members came to the conclusion that co-creation is not necessarily about sharing equally in the tasks of a project. The teams in Boston, Portland, and Durham all found that it was a better use of different individuals’ skills, areas of

“It’s working with community members to develop programming, so that they feel that they have some agency in it, that they belong.”

expertise, and capacity to let the ISE partner to lead on certain aspects of their projects and the community and civic partners to lead on others. Still, some staff hesitate to describe a project as “co-created” if the content is driven largely by one party or the other, instead of being a more

“I think that’s just generally good practice, to make sure that everyone truly understands what the product or the project is, what the process is, what the hopes are for the end product, and who’s responsible for what all along the way. But I think sometimes, it’s easy to sort of lose sight of that and sort of jump in and not really formalize the roles and responsibilities.”

collaborative effort. One staff member said that co-creation seems to imply that the end product is something that one party could not have achieved without the other. The past five years of the CC-PES project and the different initiatives teams have taken on suggest that *ISEs and community partners can take on a variety of different roles in a co-creation project, so long as all partners establish a clear understanding of those roles together*. Multiple staff members talked about the importance of transparency and taking time to clearly define roles at the outset of a collaboration.

While some of the community partner collaborations that staff described might not capture the essence of co-creation for all of the interviewees, it seems clear that an *equal dedication to and enthusiasm for a project* is more important than the equal distribution of tasks. One individual described co-creation saying, “It is truly like a partnership. You both have equal stake in what you’re creating. And you both are working towards that together.” In earlier phases of the CC-PES project, when certain partners were signaling lower-level commitment, team members felt quite doubtful about whether their work constituted co-creation. Conversely, teams that could feel the enthusiasm across the organizations felt very positive about the collaboration they had achieved, even when some of the project work fell on the shoulders of one organization more than another. This buy-in is also often tied to the origins of a project. One MOS staff member noted that *co-creation seems to occur more readily when both partners are involved in the original formulation of the project idea*. “Are they all brought in at the beginning?” this individual asked. “Do they all share a vision together?” Other staff members echoed this point, noting that often when approaching community partners, MOS already has a fairly clear idea of what needs to be achieved and what the product will look like. Staff would not describe these projects as co-created.

Providing a platform for community voices and stories was a second theme that appeared repeatedly in staff’s descriptions of co-creation and the community engagement projects that spark the greatest sense of pride for staff. In addition to the ReRooted installation and Hispanic & LatinX storytelling event, other examples of MOS providing a platform for community expression include the Hearing Loss exhibit in the Hall of Human Life (featuring a diverse range of hearing loss stories), recurring performances by famed drag star artist Coleslaw in the Charles Hayden Planetarium, and live recordings of the *Living a Triggered Life* podcast, created and co-hosted by Black couple Keith Mascoll and Roxann Mascoll on the topics of mental health, relationships, and the trauma histories.

“[MOS should pursue co-creation projects] so that we can make sure that we aren’t just hitting the museum community and audiences that are already engaged with us, but really reaching out to new communities that maybe don’t look at us as a resource.”

Interviewees spoke passionately about the value of creating space for these stories at MOS, both because these stories represent **authentic experiences with which audiences can connect** and because they are the stories of marginalized groups who historically have not felt welcome in museums.

Elevating the voices of marginalized groups is also an important objective woven into the definition of **public engagement with science** (PES) and into the mission of the Culturally Responsive Programming and Equitable Access Committee at MOS. In describing PES during their interviews, MOS staff talked about acknowledging the expertise of groups beyond the scientists and academics whose voices are typically represented in science museums, and inviting these voices into a dialog on topics of socio-scientific importance. One individual noted that museums and society need these kinds of conversations – ones that take into account both scientific information but also the values and perspectives of different groups - “so that we make good decisions about what we're doing in science, technology, or in education...” Another described PES as a way to challenge discriminatory systems that place science on a pedestal while treating other ways of knowing as deficient. In the recent *Changing Landscapes* exhibition, MOS revised the film script about wildfires in the Mesa Verde area after consulting with tribal members. Early versions of the script described wildfires as negative and destructive, whereas many tribes view fire as a source of renewal and have used it intentionally throughout history as a land management practice. Today, the National Park Service and Department of the Interior recognize the importance of “cultural burning.”⁷⁸ Consulting with tribes helped MOS take a more nuanced approach in presenting this particular climate change issue – one that balanced White, scientific understandings of wildfires with indigenous knowledge.

"Until we start to think about how we shift our processes for creating experiences, we're still going to see that division between those who see the museums and spaces that were created for them and those who do not. And so I think it's a cultural shift."

"For the individual employees here at the museum, you as an educator or staff member are learning alongside your audience [when you work with diverse partners]. Like that's so cool, right? When you have those moments."

Seeking out the expertise of other individuals and groups, being open to their feedback, and **being willing to change course** in response to that feedback are principles that tie PES and co-creation together. “It’s openness to ideas,” one individual stated. “There’s a thing about when people have a contrary idea to the one that you have. There’s some reason for that. And generally speaking, you’re blind to that reason.” Co-creation can be a step toward correcting for institutional blindness. One staff member recognized that, “Museums don’t always get things right. They historically

have not always gotten things right. And so I think that we are all collectively making an effort to learn how to do better, and how to have better representation in everything that we do.” Staff

⁷ National Park Service. (2024). Indigenous Fire Practices Shaped Our Land. Accessed Jun 17, 2024. <https://www.nps.gov/subjects/fire/indigenous-fire-practices-shape-our-land.htm>

⁸ White, G., Rockwell, D., and McDuff, E. (2021). Embracing Indigenous Knowledge to Address the Wildfire Crisis. U.S. Department of the Interior, Office of Wildland Fire. <https://www.doi.gov/wildlandfire/embracing-indigenous-knowledge-address-wildfire-crisis>

"This lens of co-creation and really bringing community voices into the museum, and really talking to them and understanding what they need is one of the ways that we become a more empathetic museum and kind of understand where we are. We can't just be a large institution that sits in the middle of Boston and not understand the people that live in our city."

also talked about co-creation helping them to expand their individual point of view and consider the blinders in how they think about their work or how they think about the different topics that MOS incorporates in its programs. One individual drew attention to the fact that many communities and individuals do not have a positive association or history with science. They argued that **museums need to be willing to create space for other ways of knowing, and co-creation is one avenue to achieve this.**

Staff's reflections during these interviews show how the values and motivations for co-creation, PES, and diversity, equity, access, and inclusion (DEAI) initiatives all overlap into a general vision of how museums should be approaching their work with communities, but also the reasons **why staff think museums should pursue authentic collaborations with diverse communities:**

- In order to create experiences that resonate with the people of diverse ethnic, racial, gender, ability, and sexual identities and help these audiences feel welcome at MOS
- To demonstrate that MOS is both relevant and empathetic to these communities
- To help diverse audiences feel they have a voice in conversations about science, and help them perceive science as a tool they can wield to shape their futures
- To provide all audiences, including traditional museum goers, with inroads to new experiences and ideas
- To improve on what MOS can achieve on its own, expanding internal skills and strength by leaning on a much wider world of experience and expertise
- To deliver on the vision statement of MOS, "A world where science belongs to each of us for the good of all of us"

In describing co-creation and similar community engagement work, staff talked more about these motivations and potential impacts than they talked about any particular process, suggesting that **co-creation is largely defined by the motivation behind the work, and the exact process will follow from there.**

One final benefit of co-creation is the more personal reward for staff. Interviewees talked about how their community engagement work has provided deep learning experiences, satisfaction, and even joy. In describing the projects below, staff expressed their pride in the work, the relationships they have fostered with community partners, and the rich experiences they have delivered for MOS audiences. More broadly, there is a sense that these projects are a force for positive change, and staff are glad to be a part of that.

EXAMPLES OF MOS COMMUNITY WORK IN 2023-24

The following initiatives are examples of community-focused work at MOS from 2023-24 that staff talked about during their interviews. Staff offered these initiatives to illustrate their understanding of co-creation or the museum's journey toward that approach. Interviewees talked about the elements of these projects that felt in line with the goals and definitions of co-creation, as well as elements that did not align. As individual case studies, they demonstrate the variety of ways that staff and MOS as a whole are seeking to build positive collaborations with community organizations and new audiences.

Pedal Power

Collaborators:

- HUBLUV (www.hubluv.org), an organization dedicated to supporting bicycle infrastructure, advocacy, access, and communication in the greater Boston area.
- HUBLUV grant recipients – local organizations working toward the same goals, as well as related issues of equity. One grantee – Bikes Not Bombs – provides training to youth in underserved communities to help them become bike repair entrepreneurs, while also providing education on issues of transportation equity.

"Some of these organizations, Like Bikes not Bombs, are doing just really tremendous work, building up workplace development and talking about it from a transportation equity standpoint... This is exactly the type of organization the museum should be supporting."

Project: A day long celebration of biking at MOS, highlighting the wellness and environmental benefits of biking as well as bike technology and engineering. The event served as a convening for HUBLUV grantees to share their work and ideas with each other and the public. Attendees were invited to browse booths of information, for example, on efforts to improve pedestrian corridors around Boston. They could also bring their bikes in for check-ups, engage in bike-related activities, listen to guest speakers, and participate in a group ride.

Backstory: HUBLUV decided to work with MOS on the Pedal Power event and provide funding for the effort, as an exploration of how collaborations with the museum might further its mission of promoting bike culture. Meanwhile, MOS was interested in creating programming that supports its Earthshot initiative. Pedal Power aligned with Earthshot goals by highlighting organizations that 1) are helping individuals feel a sense of agency for adapting to climate change, and 2) are advocating for equity in transportation.

"Although I was planning this singular event, I was thinking about how we can move forward from that... bring folks in so that we're chatting, including with the Museum of Science. How can we then begin negotiations with all of those different organizations and ask 'What place does the Museum of Science have to help you in these negotiations that you're engaged in on a daily basis and help you with your work.'"

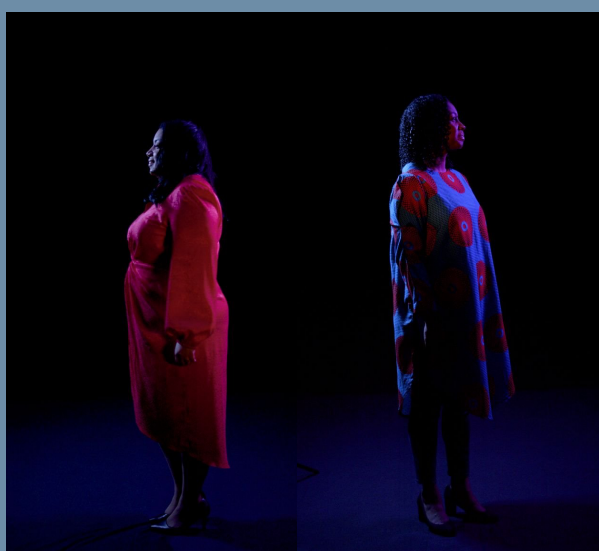
Co-Creation: The work between MOS, HUBLUV, and the grant recipients contained many elements of co-creation. First, MOS staff approached the collaboration with an open-ended mindset, aiming to let the partners' ideas shape what the project would become. The partners, however, often didn't have capacity to drive decisions and planning at the level that MOS staff had hoped for. They were also not certain how to choose a direction for the collaboration, not having worked with MOS before. As a result, MOS took the lead in

executing the event, while remaining open to any feedback or ideas from partners. Despite MOS being the lead organizer, Pedal Power provided a platform for community organizations to highlight their work and ideas, which also aligns with co-creation values. Staff also said Pedal Power supported MOS' ongoing efforts to demonstrate the museum's relevance to the lives of people in Boston – both by highlighting transportation issues that people in Boston face, and by shining a spotlight on local groups that are seeking to make positive changes. One staff member talked about this event as a starting point for future collaborations and co-creation work. In fact, the partners came together to host a second Pedal Power event in August 2024.



Bikes Not Bombs (www.bikesnotbombs.org), a Boston organization that promotes bicycling as a path toward economic mobility for Black communities and other marginalized groups, hosting a booth at Pedal Power August 2024 event

"What's Hair Got to Do with It?" – ReRooted HairStory Project



Images from ReRooted immersive installation at MOS HairStory Project page on ReRooted website: rerooted.space/hairstorey-project

Collaborator: ReRooted - a Boston collective founded by Michele Avery and Yvette Modestini that celebrates Black and Brown hair and seeks to influence the narrative surrounding it through a variety of artistic endeavors

Project: A multimodal storytelling experience about black and brown hair and African heritage, installed in the immersive theater at MOS

Backstory: The HairStory installation in the immersive theater emerged from a longstanding partnership between the

"We had lots of conversations about the level of feedback that we were giving along the way, so that we didn't necessarily step on either Yvette or Michelle's toes, knowing that they were kind of the stewards of the story."

founders of ReRooted and the Creative Director of Programming at MOS. The team had previously collaborated on a theater experience hosted at MOS, which made the work on HairStory a natural progression in an ongoing relationship.

Co-Creation: Avery and Modestin were creative directors behind the content that went into HairStory, selecting the stories and messages that would be incorporated and making the artistic decisions around how these were presented. MOS provided feedback on the content at certain intervals, especially in regards to how MOS audiences might respond to the exhibit, but deferred final decisions to ReRooted. MOS also provided the

funding for the project and hired a media partner to bring the vision to life. Team members at MOS felt that HairStory represented a co-creation project because the ReRooted team was clearly and intentionally in the driver's seat. This project is also a distinct example of MOS serving as a platform for marginalized voices. As one interviewee pointed out, no one on the MOS side had the kind of life experience featured in the narratives of HairStory. Staff hope that exhibits like these – built through strong community partnerships – are one way MOS can connect with audiences who otherwise might not see their experiences represented within the museum.

"Finding those connections [to MOS] through things like black hair, and, creating that sort of connective tissue to to science - I think that's sort of how I view public engagement with science. It's really about bringing in the public who maybe otherwise would not participate in these conversations."

Hearing Loss in the Hall of Human Life

Collaborators: Six individuals representing different experiences with hearing loss as well as demographic diversity

Project: A series of components within the larger Hall of Human Life exhibit that focus on hearing loss, including a media piece in a mini theater space that presents stories of four individuals and the different ways they have experienced hearing loss. These individuals narrated their stories in a StoryCorps type format, and a media partner created animations to accompany the voiceovers. A key driving goal of this project was to build empathy amongst visitors for the experiences of individuals with hearing loss.

Backstory: The initial impetus for this project was a funder who expressed interest in presenting experiences related to hearing loss. No one on the core MOS project team had direct experience with hearing loss, so they decided against using their usual exhibit development process and instead kicked off the project with a design charrette where individuals with hearing loss were invited to brainstorm alongside MOS staff.

"I felt really confident that the sort of process that we took, from the idea generation through to the implementation, included individuals with lived experience every step of the way."

"If at any point, one of our storytellers said, 'I don't like the way that you're representing me there,' we would absolutely change it. So it's probably living somewhere in between co-creation and collaboration where like we're responsible for it, but the content is theirs and the way that the content is portrayed to our visitors is absolutely theirs and theirs to tell us when we haven't followed it."

Co-Creation: After the initial brainstorm, MOS was able to proceed with designing most of the exhibit components using its usual process: prototyping by staff, testing things on the floor of the museum with general audiences, and revising. MOS staff wouldn't describe this work as co-creation, since aside from the initial brainstorm it was entirely driven by MOS staff. When it came to the theater piece, however, staff decided they couldn't proceed on their own. Five individuals from the initial charette were invited to brainstorm around what this particular aspect of the exhibit should include.

The original idea from MOS involved simulating hearing loss for visitors; however, the stories that the advising team shared about their own experiences with hearing loss were so powerful that the team decided to entirely change course. The team decided that if the end goal was to promote empathy, these authentic narratives from the storytellers were far more powerful than anything the exhibit team could come up with. One MOS staff member interviewed about this project was not certain if it qualified as co-creation and suggested it might lie somewhere on a spectrum between that and collaboration. On the one hand, the initial project idea came from MOS, and MOS was responsible for executing the project. On the other hand, MOS was willing to entirely reshape the project based on feedback from the story tellers. MOS also directly featured the perspectives of the storytellers instead of using voice actors, tweaking the tone, or otherwise influencing the product as they might in a more traditional process.

Changing Landscapes

Collaborators: Representatives of the Rapa Nui people of Easter Island, 26 tribes with affiliations with Mesa Verde; CyArk – a company that works to preserve cultural heritage sites through digital renderings

Project: *Changing Landscapes: An Immersive Journey* is a temporary exhibit at the Museum of Science which invites visitors to explore four different UNESCO world heritage sites impacted by climate change. In describing the exhibit development process and its relationship to community partnerships, staff members highlighted the work on the Mesa Verde and Rapa Nui segments in particular.



Mesa Verde projection in *Changing Landscapes* exhibition

Backstory: The *Changing Landscapes* exhibit is part of a yearlong initiative by the Museum of Science called Earthshot – a suite of programs and projects that share the common theme of highlighting innovative adaptations and solutions in the face of climate change. MOS sought feedback and collaborative input from a variety of community partners while developing the exhibit.

Co-Creation: MOS did not have previous relationships with the communities on Rapa Nui or surrounding Mesa Verde, so their work began by reaching out to tribal and clan representatives, often through their collaborator CyArk who had worked previously with some of these communities. In the case of Mesa Verde, only a few of the original contact attempts developed into a back-and-forth relationship, but these individuals were able to provide feedback on the

"The presenting of ideas and getting feedback feels less like co-creation in the way I define it."

film script and help MOS incorporate indigenous perspectives they otherwise would have missed. The collaboration with Rapa Nui representatives ended up going deeper, thanks to a tribal advisor who had the capacity to work closely with the MOS team. The relationship was also established early in the exhibit development process, which allowed feedback from the Rapa Nui to have more influence on the direction of the project. Their input led to

MOS working with a local artist who carves modern moai, one of which was 3D scanned and printed for incorporation in the exhibit. The Rapa Nui also helped shape an interactive drawing activity presented in the exhibit. One MOS staff member described the work with the Rapa Nui as a successful partnership, but they didn't think this work or the other partnerships of *Changing Landscapes* qualified as co-creation. MOS was the driver of the initial project idea and the ideas for the individual exhibit components (the films, activities, etc.). They were also in charge of the day-to-day decision making for the project, although they took the input from the tribes quite seriously. In some respects, the collaboration process was similar to that undertaken for the Hearing Loss exhibit in the Hall of Human Life. The open question, however, is whether the communities involved felt a level of ownership and control that might single this project out as a co-created endeavor.

Heritage Months

Collaborators: Professors and other academics of diverse backgrounds from local universities and industries; Stiggity Stackz Worldwide – a Boston-based group that celebrates freestyle dance as a Black

"It's a great step in making way for co-creation, so that when we host groups [through Community Spaces program] or we have them table at Heritage Months, and we have them get a feel for the things that we do, and they get to see some of our programming or they get to see us – they can start to envision things that they would like to do [with us]."

culture art form; Ana Tinajero, a local Hispanic artist, dancer, and curator]; and many other partners

Project: Heritage Months at MOS include a variety of program types, including traditional live presentations and featured speakers, hands-on activities at the intersection of science and culture, and performances by local groups representing the ethnic and cultural heritage being celebrated. The museum celebrated three Heritage Months in 2023 and is expanding to four in 2024. During the October 2023 Hispanic and Latinx Heritage Month, MOS collaborated with Ana



Tinajero to produce a special community storytelling event, where individuals from the community could tell stories about their relationship with science. Stiggity Stackz has done both live performances and informational booths at MOS during Heritage Month weekend events.

Backstory: MOS' Heritage Months have been an impetus for reaching out to new community partners and individuals, in order to invite them to be a part of the various programming that takes place. Staff are aware, however, that reaching out to partners

because of their cultural or ethnic background for Heritage Month celebrations is problematic, unless the museum is willing to sustain the relationship and find other ways to collaborate beyond that single month.

Co-Creation: MOS' Heritage Months as a whole are not co-created endeavors, since these initiatives were conceived by the museum, MOS staff drive the bulk of the decision-making, and potential partners are identified to fill in the vision for the month as needed. Nevertheless, some individual programs within these Heritage Months do incorporate certain co-creation elements, including the Hispanic and Latinx storytelling event created by MOS and [partner]. Once [partner] agreed to work on the project with MOS, they took the lead in identifying the individuals who could serve as storytellers for the event. They also helped make decisions about the design of the program, including its length, the key themes they wanted to emphasize, how the event would kick off, and how it would wrap up. In other cases, the Heritage

"It's just a tough way to go about it when you're trying to build authentic relationships, but you're asking people to come to a specific thing for a specific reason that's related to their background or heritage... One thing we're trying to get better at it is to not really think of it as – we're only going to invite people of a certain background for these heritage weekends, but to invite them anytime."

Months have provided a starting point for establishing relationships with potential partners that in turn might lead to deeper collaborations. Stiggity Stackz, for example, participated in two Heritage Month weekend events before going on to collaborate with MOS on their [freestyle dance festival](#), held at the museum in September 2023. Stiggity Stackz later did a night program at MOS, and now the two organizations are working on a new initiative, where Stiggity Stackz representatives will co-create workshops with MOS program staff around the topics of music, dance, rhythm, and science. “We’re continuing on this road where they’re getting closer to co-creating with us,” one staff member stated. They also noted that it has taken a year and a half for this work to evolve, and that this is what an organic relationship-building process looks like.

SubSpace Events Featuring Community Artists and Thinkers, Designed for Underrepresented Audiences

Collaborators: [Triggered Project](#) founders Keith Mascoll and Roxann Mascoll with DJ Mo Wilks; Coleslaw, award-winning DJ and drag artist; Jeneé Osterheldt, columnist and now Deputy Managing Editor for the Boston Globe who focuses on issues of cultural identity and social justice

“I would say, for us, everything that we do in SubSpaces usually has some sort of tie to a social science or these themes of identity, these themes of equity.”

Projects: SubSpace is a designation MOS has created for a new brand of adult programs at the intersection of art, science, and technology. Some examples of SubSpace programs from the past year include:

- Live recordings of [Living a Triggered Life](#), a podcast where co-hosts Keith and Roxann Mascoll discuss marriage, family, relationships, mental health, and trauma in Black and Brown communities. The events opened with music by DJ Mo Wilks, leading into on-stage interviews with the Mascolls followed by an audience Q&A (2021-present).
- Drag performances by Coleslaw and other artists in the Charles Hayden Planetarium (2019-present), as well as [virtual programs](#) where Coleslaw interviewed MOS scientists when the COVID-19 pandemic interrupted in-person performances. Coleslaw’s MOS collaborations have included silly, fabulous, and stunning performances, as well as serious discussions about mental health, LGBTQIA identity, and science.
- [Live performances](#) of *A Beautiful Resistance*, an artistic project created by Jeneé Osterheldt to lift up the stories of Black individuals and share Black joy. For *A Beautiful Resistance* at MOS, Osterheldt holds on-stage interviews of individuals from the Boston community who are pushing for social justice in a variety of ways for a variety of communities, shares short films, and engages in dialog with audiences.



Live recording of *Living a Triggered Life*

"We have to trust that the decisions that our partners will make will help us create truly authentic experiences for the community that we're trying to sort of engage with them and through them."

Backstories: Many of the SubSpace events at MOS have grown out of relationships fostered by a single MOS staff member with longstanding ties to theater and arts communities in Boston. Over time, the level of trust between these various performers, artists, and thinkers and the museum has strengthened.

Co-Creation: Each of these SubSpace programs is an example of the museum providing a stage (both literally and figuratively) for marginalized groups to engage directly with audiences and share stories or artistic expression that is important to their communities. In these partnerships, the MOS has served primarily

as a host and funder, leaving content and creative decisions up to its community partners, who are experts in their own right. One such decision is to have a live DJ set the tone for events, so that audiences arriving – including racially diverse people who are often underrepresented in MOS' visitor population – feel more at ease. Reflecting on early collaborations around these events, one MOS staff said that allocating a significant chunk of a project's budget to a live DJ initially gave them pause. In the end, however, they said it sent an important signal about how the museum wants to engage with these audiences, and the willingness of MOS to "create space and turn space over and turn our platforms over to leaders in their community." MOS staff see these kinds of events as integral to breaking down some of the barriers that have existed historically between museums and marginalized communities, and also between science and marginalized communities. Black and Brown individuals, or Queer individuals, might experience MOS for the first time through one of these events, and from there be motivated to return to MOS to engage with other kinds of STEM programming. An MOS staff member described it as a step toward the goals of PES – creating pathways for broader audiences to engage with socio-scientific topics and have a voice in the issues that matter to them. At the same time, these events have the potential to create a bridge between traditional museum-goers (predominantly white, hetero, and of higher socio-economic status), and the experiences of diverse people in their city. One MOS individual noted that they have had numerous conversations with straight individuals who said they had always wanted to attend a drag show, but had never felt quite comfortable until the shows at MOS gave them the opportunity to attend in a familiar space. In this way, MOS is helping to broaden horizons in multiple directions.



Coleslaw performance (image credit: Boston Globe)

Community Spaces/Community Access

Collaborators: A variety of community organizations from around the Boston area, including 10 new groups in the past year.

Initiative: The Community Spaces program provides free facility space at MOS for community groups to hold their meetings and events. Organizations often also receive free passes to the exhibit halls to offer to their constituents, as well as food vouchers for use in the museum café. MOS has also been working on ways to provide transportation vouchers to these groups, although this has presented a greater logistical challenge. In addition to the Community Spaces program, MOS has a [Community Access](#) program that provides free admission to non-profit community organizations that serve populations consisting of at least 25% economically disadvantaged people.

Backstory: The Community Engagement team at MOS has been working to initiate new relationships with community organizations across Boston and invite them into the museum via the Community Spaces program. This work often involves attending community events outside the museum and networking with the kinds of audiences to whom MOS wants to extend a welcome.

Co-Creation: Staff would not likely describe the Community Spaces or Community Access programs as examples of co-creation (although this question did not come up directly). In both programs, MOS is providing access to resources, but not necessarily working with partners to create any kind of product or initiative. Staff members did point out, however, that it's an excellent in-road for establishing a relationship with the community partners, that in time may lead to additional work together. "We can't just go to an organization and say, 'We want to do something with you, and we want you to come in and do something with us.' It's establishing trust," one staff member stated. The Community Spaces Program is a way for MOS to demonstrate its commitment to serving the needs of local groups. One individual also pointed out that it provides a valuable opportunity for these groups to get to know the space at MOS, the kinds of work MOS is doing, and where there might be potential avenues for collaboration.

"Really what it is, is that these community groups, one of the things that they get shut out of a lot is space. And so the fact that we're making space available at all is a big thing for them. So we find that if we can host them in a space, and they feel like they're welcome - that's a big win in the book."

Youth Staff as Co-Creation Partners

Collaborators: Youth staff at MOS, including Research and Science Communication Assistants (RSCAs) and Research, Development, and Evaluation interns (RDEs); Massachusetts Department of Conservation and Recreation (DCR)

Projects: MOS engages its youth staff in a variety of projects in order to make sure that a young perspective is incorporated into programs and exhibits being developed. Youth in the RSCA program and RDE program are invited to serve as project advisors, and they organize and hold listening sessions with other youth to bring their ideas into the projects that MOS is working on. In a separate collaborative venture, MOS Research, Development, and Evaluation Interns engaged with an external partner – the Massachusetts

"We have not partnered with an external organization like that before on my team [youth team]... to create something sort of from scratch that the community has identified that they need."

Department of Conservation and Recreation – to design an interpretive activity for use in the parks and green spaces DCR manages. The RDE team engaged DCR staff in listening sessions about the park's needs and visitor habits, then prototyped and improved an activity about a topic selected by DCR. The DCR decided it should focus on wildfires due to the intense 2023 Canadian wildfires that had far reaching effects on New England and beyond.

Backstory: The other collaborative projects that MOS youth have engaged in have involved seeking input from the community in order to improve MOS programs. These teams have gathered feedback both from other youth and from community organizations where MOS conducts outreach programs. This project, however, represented a new kind of partnership, more directly driven by the needs of the collaborating organization.

Co-Creation: The work between the RDEs and DCR was a very collaborative effort, exhibiting many of characteristics that MOS staff ascribed to co-creation in their interviews. Both partners brought important skills and knowledge to the table. In the case of DCR, this was knowledge of their outdoor visitors, place-based knowledge of the parks and spaces where the activity would be implemented, and ecology and other science content knowledge that could be incorporated into the activity. MOS interns brought an understanding of how to create engaging and educational activities, as well as a process for designing and testing these with audiences. In describing the project process and division of tasks, an MOS staff member noted that the two partners for the most part stayed in these lanes: DCR as expert consultants, and MOS interns as creators and implementers. Nevertheless, MOS staff felt the partners established an effective relationship that allowed MOS to directly address a need identified by DCR. Furthermore, the project was timely in addressing an important socio-scientific problem affecting New England residents. Unlike the other projects described here, however, this project has less obvious connections to DEAI efforts and marginalized groups. DCR may perhaps represent more of a governmental partner than a community partner as identified in the CC-PES model and in the MOS community schematic (see p. 12). On the other hand, other work being taken on by the RDEs and RSCAs at MOS – the listening sessions and other work these teams do to bring the youth perspective into museum initiatives – is most certainly lifting up the voice of a marginalized group.

"I think a really important feature of functionally engaging in that process [co-creation] for my team has been to engage in a lot of listening early on... We're coming with our own goals. What are the things that the other organization or the other people that are part of the conversation coming to the table with? And then how, where can we find alignment between those two things?"

CHALLENGES TO CO-CREATION AND SUPPORTS NEEDED

The CC-PES project and the model it has presented are intentionally pushing beyond a traditional approach to developing museum programs. In doing so, they run up against a number of ingrained systems that naturally present obstacles to co-creating with community partners. While the list of challenges below may seem daunting, it is also a testament to the hurdles that MOS staff and other teams have navigated while pursuing their co-creation work with community partners.

Some of the challenges that staff described for co-creation projects are rooted in the power imbalances and sometimes demographic and socio-economic differences between organizations and individuals seeking to work together. One staff member talked about the difficulty of approaching marginalized groups as an outsider, noting that sometimes one's positionality can feel like a hindrance. Another described community-work as requiring frequent apologies, "acknowledging past wrongs by the institutions of which you are part." Staff have to be mindful that the work doesn't become extractive, resulting in greater gains for the museum than for the partner. Individuals talked about the value that partners bring to projects at MOS through the authentic and powerful stories they have to tell. MOS has to be careful that they are not disproportionately benefitting by attaching this content to the museum's brand.

Another key challenge identified in the earlier phases of the CC-PES project is that **co-created projects take time**. In order to establish strong relationships with community partners, staff need to establish understanding, trust, and shared ways of working together – work that does not unfold quickly. Cohort III of the CC-PES project attempted to follow the project roadmap in just six months, but teams agreed this was not ideal. Unfortunately, there are many internal and external time pressures on museums to innovate quickly and stay on the cutting edge in their programming. The museum's desire to offer programming that is highly relevant to audiences means often means moving quickly in response to current events. The vaccine programming MOS provided during the pandemic is one example of this. These kinds of fast pivots are difficult when partnering with outside organizations, however, and especially when working with

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We created the foundation for our **Centers for Public Learning** early in the COVID-19 pandemic through timely and engaging exhibits such as **Project Vaccine: Our Best Defense**. We extended our reach far beyond our walls through media-rich, interactive websites, town calls, community events, vaccine clinics and statewide polls. 74% of those reached were motivated to act and share what they'd learned.

Snapshot from the "Vision" page of the MOS Science in Common initiative,

<https://scienceincommon.mos.org/the-vision/>

Relationship-building with community groups can be slow work, but museums like MOS are also pressured to respond quickly to current events and offer relevant programming to audiences on topics such as the Covid-19 pandemic.

community groups with limited staff and resources. Several staff members brought up the new motto of the MOS Centers for Public Learning, “Science at the pace of change,” and commented on how this often feels at odds with the relationship-forging they would like to do.

“I think that there’s a competitive tension there – at least for us – to do things fast. Just the pace of work. I think slow work isn’t as easy to do as it was pre-COVID, for whatever reason.”

Time constraints are also often a product of [funding systems](#) – another of the major challenges facing co-creation projects. Grant-funded projects (which account for a great deal of the community-focused work at MOS and at museums nationwide) run on distinct timelines with start and end dates. Project timelines often don’t allow for the slow, upfront relationship building that leads to productive partnerships. Furthermore, when a grant-funded project is complete, it is easy for these relationships to dissolve without resources to continue the work together.

Museums that aren’t able to maintain a relationship beyond the grant period are sending a negative message to community organizations about their willingness to commit for the long term, and this can be particularly damaging when those organizations represent vulnerable groups who have historically been used and then abandoned by groups in positions of power.

Funders can also put pressure on their grantees to demonstrate certain kinds of impact through their work, in a way that doesn’t necessarily align with the values of co-creation or the reality of working with community partners. [Granting agencies and other funders tend to focus on products of the work instead of on the process through which it is developed.](#) There can be a tendency to privilege outcomes that can be captured quantitatively, such as large numbers of audiences reached or other metrics that focus on scale rather than quality of relationships. MOS staff also pointed out that community-based work is slow and often “messy,” especially when establishing new relationships between organizations. There can be misunderstandings and mistakes as the parties get to know each other and figure out the best ways of working together. One individual, in describing co-creation, noted that it’s important to realize you are not going to get it perfect on the first try or every time, and yet there is valuable learning that can happen through the process. Funders, however, may not be receptive to hearing about the bumpy road of co-created projects. Furthermore, grant programs usually require grantees to clearly identify their goals and deliverables at the outset, which is at odds with some views of co-creation. One staff member pointed out that it is difficult to authentically collaborate with a community partner when a project path has been predetermined at the proposal stage. True co-creation work means being flexible and responsive to the needs and ideas of community partners.

“If we go away when our grant money goes away.. that just feeds into the belief that there’s no point in getting involved in any of these kinds of projects with an organization like ours, because we’re just going to use them to get our project done.”

Besides the pressure from funders, staff also acknowledged that there can be internal, institutional pressure to deliver highly polished work when the MOS name is attached. Large institutions like MOS have high standards for their programs and exhibits and have rigorous processes for maintaining those standards. Interviewees pointed out, however, that allowing

community partners to lead on projects means being willing to bend the rules or be open to a different standard. In the Hearing Loss exhibit, for example, staff talked about using the voices of their advisors rather than hiring actors and instructing them closely on how to deliver their lines. Authenticity was more important than control in this case. Another individual talked about utilizing spaces and resources for the Community Spaces program which aren't perfect, but which partners are completely happy to have access to. In this case, staff noted that finding ways to work together with the resources available is more important than waiting for renovations to be completed.

One resource that is critical to developing and sustaining co-creation partnerships is people. MOS staff said their work to forge meaningful relationships with community partners has often been hindered by [staffing constraints](#). They noted that the Community Engagement Team has downsized from seven individuals to just three in the past few years, which has made it difficult to keep up with a variety of projects and initiatives. One staff member pointed out that a large institution can't rely on just a small handful of individuals to sustain the work of co-creation and community partnerships, which can be a very heavy load. Staff turnover can also pose a blow to co-creation projects and partnerships with community organizations when a critical individual leaves a team. The CC-PES project has demonstrated how cross-organizational relationships are often built on the shoulders of individual relationships. Several of the projects profiled above grew out of relationships fostered by a single individual at MOS. As one staff member noted:

I think that a lot of the partnerships and relationships depend very much on the individuals that are in the roles that are, you know, the bridges between the institution and the partner, and I think if somebody leaves that can disrupt the relationship between the two organizations. It's not bad, but just a disruption.

"Now we have like 17 projects all happening at the same time, and you want to give them all the care and the attention and the partnerships, all of that thoughtfulness you can, but there's limited bandwidth and shared resources that definitely present a challenge."

The projects may continue after an important staff member leaves, but the work is often slowed down, and relationships have to be forged anew. Staff also talked about shifts in workloads and resources since the pandemic. One individual said staff seem to be juggling an increased number of projects, and that this can pose a difficulty for partnerships and an individual's ability to give enough attention to any single one. Another individual described the shift as a change in resources or the way work is happening: "I know everybody's short-staffed and resources are different – not necessarily fewer. Resources are just different now. There's also just some wild work load

thing that happened as well, or a shift in execution." Whatever the actual change might be, staff seem to sense of shift which puts a strain on their ability to pursue deeper projects with partners. "I think to do this work well requires time and investment," one individual commented, "and right now, it's not carved out for uniformly across the institution as I would like for it to be."

In describing co-creation during their interviews, almost all staff talked about the **lack of a shared definition** across the institution and the challenges this presents. Some staff said they have heard the term “co-creation” used to describe everything from soliciting input during discrete stages of a project to full partnership and decision-making authority. Inconsistent ideas about co-creation or inconsistent approaches to working with community partners can cause confusion for those partners when they engage with different staff or teams within MOS. If a partner is granted a certain level of agency or trust in one context, but then receives different treatment in another, it can quickly damage the relationship between organizations and individuals. These discrepancies can also create internal confusion and friction between MOS staff.

“I hear that word 15 times a day in different conversations, and everyone that uses it has a slightly different idea or definition of what that means. And so I think that's just where we have to be careful...”

“There are real differences in how I think community perspectives or partnerships are viewed across different groups at the museum. I think it's because there are so many different industries that come together at the museum, like people's experience.”

The mix of definitions is a symptom of general **differences in the ways individuals and teams are accustomed to working with community partners**. One individual noted that it's natural for different departments to have different approaches or work styles, but interviewees expressed a wish that community-focused work at MOS could establish some shared norms. Furthermore, co-creation is closely interwoven with DEAI issues in museum work, but one individual pointed out that not all teams or staff members are tuned in to the places where inequities may exist in their work. One staff member, for example, stated their firm belief that community members should be compensated for their

time when they help MOS develop a program or product, but this idea may not occur so readily to individuals in different contexts within the museum. The staff interviewed are eager to advocate for progressive change for underserved and marginalized audiences, and common definitions or a set of best practices (something the Culturally Responsive Programming and Equitable Access Committee is working on), may help in this regard. Not only will this help MOS staff work toward common goals, it will result in better relationships with partners as they collaborate with different teams across the institution.

“There's a level of consistency even within an organization itself. Like the way that I would work with a partner may be different than the way that another department might work with a partner. And I think, on the partner side, that might be confusing and maybe challenging to adapt because we're just one science museum.”

CREATING INSTITUTION-WIDE APPROACHES TO CO-CREATION AND COMMUNITY PARTNERSHIPS

In the first three phases of the CC-PES project, the work was achieved by small teams: just a few individuals from the various partnering organizations, working more or less independently from their larger institutions. The final year of the project presented the opportunity to think about co-creation at a larger scale. What lessons can museums learn from the work of these individual teams that could be applied across the organization? How can large institutions like MOS support this work? While the CC-PES project has shown that there's no single solution or formula for achieving meaningful community partners, conversations with MOS staff highlighted the following ways that large organizations can work toward this goal.

Developing Common Understandings and Making Space for Conversations

Staff agreed that MOS does not currently have a common understanding of what co-creation means or set procedures for how to approach this work. They cited examples where teams are not aligned in how they think about MOS community engagement and the problems this can cause. Offering free space and free museums passes to partner organizations and their constituents, for example, has sometimes created tensions for individuals who feel pressured to make sure the museum is profitable and responsible with its resources. Interviewees expressed the wish for shared definitions or understandings, so that different individuals and teams could better align their efforts and work more consistently with their community partners.

"[MOS has] so many moving parts and so much complexity, that to align everyone - you know everyone's going to have their own processes, their own way of working with people, their own values that they bring to partnership or conversations with partners, and I think trying to get those to align will just be very, very slow work."

Unfortunately, staff also had a somewhat difficult time expressing their own definitions of co-creation because each partnership and project brings its own nuances. For this reason, it is difficult to draw hard lines about what constitutes co-creation and what does not. Worrying about definitions can also be counterproductive when they are value-laded. As one staff member pointed out, there are a variety of ways that museums can partner successfully with different organizations. Ranking or categorizing these is less important than examining whether or not a collaboration was mutually beneficial and why, regardless of how it played out.

While a set definition of co-creation may not help MOS and other institutions move forward, there is clearly a need for ongoing discussion about community engagement work across teams – conversations that can bring different understandings to light and help establish guiding principles,

not prescriptions. Making space for these conversations, and acknowledging the competing priorities that influence community work may help staff find ways to forge the path forward together.

Promoting a Culture of Relationships (Over Products)

In considering the meaning of co-creation versus other forms of partnerships, one staff member pointed out that it's important to be having these discussions with community members and organizations – not just internally at the museum. More important than settling on common definitions, however, is taking the time to talk about the relationship between organizations and what it will look like:

I think it's important to have common definitions. I think it's important at some point to figure out whether our understanding - my understanding - of co-creation, collaboration, etcetera, gels with the understanding of our community members, but ultimately, it's just a starting point to talk about the relationship. And as long as you talk about the relationship, and everyone knows what it is and how we're mutually defining it, then I think it doesn't matter what we call it.

Other staff brought up similar points, noting that in all partnerships, it is important for staff on all sides to get to know each other's organizations and their respective goals, their motivations and values, the kinds of work they do, what the constraints are, and what the possibilities are. When new partners undertake an initiative together, the sooner these conversations happen the better. Prior research on co-creation,⁹ as well as previous reports from this project,¹⁰ point to the same thing: relationships and trust are at the center of co-creation endeavors, and they require work upfront to establish.

Giving these relationships the focus they need may be a shift in perspective for museums, where the work is often very project- and product-oriented. As noted above under Challenges (p. 28), funding and other institutional structures can privilege deliverables over process, but one staff member pointed out that establishing trust between organizations has to come first: "We can't just go to an organization and say, 'We want to do something with you, and we want you to come in and do something with us.'" Staff need to think less about specific end goals, and more about how they are approaching their work with partners.

Privileging relationships over products means museums may also need to rethink how they measure and communicate success, spending more time talking internally about these partnerships and conveying this information to outside stakeholders as evidence of the impact MOS is having in the world. While funders put pressure on how museums design their projects and measure their success (see Challenges, p. 28), one individual pointed out that MOS may be able to push back against these given its status as a highly successful grant recipient and major player in the museum community. "I think with that power, we can use that to sort of begin to re-examine our relationship to granting agencies and the responsibility we have," they stated. This might mean pushing for more funding to support relationship-building work, bringing community

⁹ Kroning, M. (2017). Co-Creation in Practice: Literature Summary. [Literature review prepared for the Exploratorium]. https://www.exploratorium.edu/sites/default/files/pdfs/IMLS%20Co-Creacio%CC%81n%20Lit%20Summary_2017_final_0.pdf

¹⁰ Quimby, C., Sanford-Dolly, C., Fedje, K. (2021-23). Co-Created Public Engagement with Science: Phase I/II/III Report. Rockman et al Cooperative. <https://www.nisenet.org/catalog/co-created-public-engagement-science-cc-pes-project-reports>

partners on earlier in the proposal process to inform the design of projects, and allowing project plans to shift according to the needs and priorities of community partners.

Allowing Imperfection

Relationship-building and team projects that span organizations are not easy or simple, thus MOS and similar institutions embracing this work must also be willing to embrace imperfection. In describing their work alongside community partners, many members of the CC-PES project and staff at MOS have talked about the importance of being willing to fail and improve. Staff interviewed in the early phases of the project often expressed disappointment at how certain parts of their project process had transpired – how they wish a partnership had been more productive or that communication had been better. MOS staff, in their interviewees several years later, were aware that these are some of the inevitable bumps in the road. One individual stated, "Co-creation and public engagement with science I think are both aspirational goals. I think acknowledging that from the start, that you will not achieve them, that you are going to fail, but it is through that process that we are learning how to do it better." If institutions can also convey this message from above, to support staff in their trials and setbacks, teams may be more willing to take the leap and change the way they approach their work with community partners.

This lesson also applies to working with marginalized communities. Several MOS staff talked about the difficulties wrapped into this work and the trepidation that individuals can sometimes feel about even getting started. Nevertheless, staff also clearly believe in the importance of bringing these voices into the museum and finding ways to promote them through their programs and exhibits. One staff member commented on the need for humility and a willingness to learn from mistakes. Other staff asked for outside supports and resources that can help them understanding how best to work with different populations. This is another area where museums can offer strategic help in support of community engagement work – for example, through professional development that gives staff strategies or the opportunity to talk with others who have engaged in similar partnerships.

Planning for the Long Term

Investing in relationships also means planning for the long term. Once a relationship has been established and strengthened, a co-creation initiative might proceed quickly. The Hair Story installation is one example (p. 19). The partners involved were able to quickly establish and execute a vision together thanks to their previous collaborations and the longstanding relationship that existed between MOS staff and the ReRooted founders. If a partnership is new, however, it is safe to assume that work will proceed slowly as organizations and individuals get to know each other. One staff member pointed out that it's this time and continual contact and discussion between organizations and individuals eventually leads to the really good ideas. They described the work between MOS and one of its community partners, saying: "It's basically just this idea train that has just been going, and the way that we've been doing it is just like slowly, letting them kind of percolate these ideas." They noted that the work with this partner is getting closer to what they would describe as co-creation, but that it has taken a year and a half because they are letting the relationship develop and ideas to come about organically.

Staff expressed the wish that MOS would find ways to carve out the time to develop relationships, but noted that it can be hard given the pace of project schedules. One staff member pointed out, however, that it's okay if good ideas arise that don't fit within the constraints of a particular project or grant timeline, such as the one-year Earthshot initiative: "We don't have to be so beholden to our own timelines necessarily. They're good for structuring, getting ourselves aligned. But then if there's stuff that comes up that doesn't fit in, we should just expect that and make a little space for that." Doing so will help institutions like MOS think beyond single projects and funding cycles, another step toward privileging relationships over products.

Engaging Different Museum Teams in Different Forms of Relationship Support

Establishing and maintaining relationships with community partners can be time and resource intensive, but the interviews with MOS staff pointed to a number of ways this might be managed across a large organization. Single individuals and particular teams will likely always play a critical role in certain relationships, but museums can also think about the ways relationships with outside organizations are shared museum-wide and the roles that different teams might have in supporting those relationships. Not all teams or individuals need to be engaging in co-creation projects, but there are still ways they can support the work.

One example is to think of certain initiatives and programs at the museum as "relationship incubators" or "entryway programs." The Community Spaces program is one example, or inviting a community organization to host a table at a weekend event. Staff pointed out that these are a good way for other organizations to begin to understand the kinds of work that MOS does, and then envision future collaborations together. Another individual talked about traditional, museum-led programming – such as school outreach programs developed and run by the museum's Community Engagement Team – as a "bridge" to work with *other* MOS teams on co-creation projects – teams that might have the right kinds of timelines and resources to take on this kind of work.

Another example might be leveraging the skills of a museum's marketing or social media team to help promote the work of the museum's community partners. When MOS and other museums bring the voice of community partners into their programs and exhibits, they often benefit from the authenticity and the passion that these partners bring to their work. Staff pointed out that it's important that museums don't reap this reward without also uplifting the names and achievements of the organizations with whom they are partnering. One individual suggested "The museum is a megaphone that has 1.4 million people pass through its doors every year, that connects to 100 million people online, or 200 million people online," one staff member stated. Anything that MOS can do to promote its community partners can have tremendous impact, and marketing and social media teams can be an important part of that equation.

Another suggestion might be to support community partners in the grant application process. One staff member talked about a newly funded project that MOS has taken on with Dope Labs duo Zakiya Whitley and Titi Shodiya. Collaborations with Dope Labs started with live recordings of the podcast in the museum's theater space. MOS and Dope Labs then envisioned a planetarium show project together and submitted a proposal to NASA. MOS staff took the lead

on writing the grant and handling administrative details, but Dope Labs will be the lead content creator on the actual project.

These are just a few ways MOS and other museums might think about their various teams and the roles they have to play in supporting productive relationships with community organizations. The need for support from different teams also underlines the importance of having discussions about these relationships and the nature of community work across the organization.

Thinking Differently about the Museum's Role

Co-creation projects often call on museums to rethink their role in relation to community partners, stepping back from certain responsibilities (such as driving program content) and finding other ways to support the work. The roles below represent some of the examples highlighted in MOS staff interviews, as well as in interviews during previous phases of the CC-PES project:

- **Convener** – In the Pedal Power event and in the event held by Orlando Science Center during Phase III, the museum served as a convener of organizations with like interests, providing a way for these organizations to share ideas and resources. The MOS strategy diagram on p. 12 also positions the museum as a connector between varied community groups and organizations. In co-creation projects that seek to bring different voices together, the convener can be a natural and important role for museum partners.
- **Resource Support** – Large museums like MOS have more resources at their fingertips than the small community organizations highlighted in projects above, including but not limited to funding, staff, and facility space. By lending these resources to community partners, museums can serve as a platform (sometimes literally) for important topics that align with the mission of partners and of the museums as well.
- **Ally and Advocate** – Co-creation work that brings in marginalized communities often calls on museum staff to become allies and advocates. In Phase III of the CC-PES project, the Durham team talked about learning to listen to and honor the perspectives of the individuals they were working with – families that had been without housing. An MOS staff member talked about riding their bike to work every day, as a way to understand the transportation challenges around the city of Boston that their community partners are working to address. Two other MOS staff talked about the importance of showing up at community events outside the museum, in an effort to build more authentic relationships with partners and stay aware of issues that affect local communities. Teams carrying out the CC-PES model have also had to navigate the “action step” of the process, finding new ways to spread information and encourage dialog about their project topics. The Durham team, for example, has done book readings in the community and has spoken before city councils about housing issues.
- **Information Translators** – By asking teams to address socio-scientific issues with community partners, the CC-PES project has sometimes pushed them into the

unfamiliar territory of complex social topics like homelessness or gun control and safety. The Durham team especially expressed uncertainty about their role and their right to speak about homelessness with museum audiences, since museum staff members did not have lived experience with homelessness or previous research experience with this topic. In the end, however, they found that their skills as educators could play an important part in the project, helping them to translate complex information on the subject into engaging and thought-provoking activities for their forum participants. Their work demonstrates that ISEs do not have to be firsthand experts on socio-scientific issues in order facilitate discussions and programs around these issues.

This list, though not exhaustive, points to some of the ways that museums and their staff can think about their position on community-focused work and co-creation projects. Museums are home to a wide variety of skillsets and unique assets, and finding the right ways of leveraging these in partnership work is sometimes just a matter of time and opportunity.

CONCLUSION

As the CC-PES project winds down, MOS staff interviews have highlighted the complexity behind terms like co-creation and public engagement with science and the many different values and approaches that can be described with these terms. Scholars have previously offered the idea that co-creation is a spectrum.¹¹¹² Others have described it as the upper rungs along a ladder of participation.¹³ While there are no hard definitions or a prescriptive list as to what does or doesn't constitute co-creation and PES, the reflections here provide guiding principles that can help other individuals and institutions examine and improve the way they partner with community organizations.

MOS staff have also underlined the benefits of this work: what makes it worthwhile to both museums and partnering organizations and how it is pushing the museum field forward to be more responsive to its audiences and reflective of its communities. The path toward better co-creation and better community partnerships is not easy. The challenges outlined here are significant, and the suggestions for institutional shifts are not simple to implement. Still, the staff interviewed feel strongly about the importance of doing this work. As one individual stated, "I don't want people to be fearful of doing it wrong. I want people to try, but also realize how damaging it could be to *not* do it." Staff believe that these kinds of collaborations are the future of museums – their role and their responsibility. They may also be crucial for sustaining the relevance of museums in a changing world. We hope that the many examples of co-creation and museum/community partnerships documented through the CC-PES project can serve as inspiration and support to other organizations as they pursue this work in the future.

¹¹ McLean, K., & Pollock, W. (Eds). (2007). *Visitor Voices in Museum Exhibitions*. Washington, D.C.: Association of Science-Technology Centers Incorporated.

¹² Bonney, R., Hallard, H., Jordan, R., McCallie, E., Phillips, T., Shirk, J., and Wilderman, C.C. (2009). *Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education*. A CAISE Inquiry Group Report. Washington, D.C.: Center for Advancement of Informal Science Education (CAISE).

¹³ Arnstein, S. R. (1969). A Ladder of Citizen Participation. *Journal of the American Institute of Planners*, 35, 4: 216-224.