# kalvi-report-webinar-final

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**0:00:02.3** **Shobita Parthasarathy:** Hi, everyone. Good afternoon. My name is Shobita Parthasarathy and I am the director of the Science, Technology, and Public Policy program, or STPP, at the Gerald R. Ford School of Public Policy at University of Michigan. Before I start talking about today's webinar, I just want to mention that the webinar includes live closed captioning. You can view captions two ways, through Zoom or via an external browser link, which we are sharing in the chat. If you're accessing captions within Zoom, click on the CC or Show Captions button on your main Zoom menu. Typically, this is on the bottom of your Zoom window. From there, you can turn captions on and off and adjust their size. So it's my great pleasure to welcome you to this afternoon's webinar on STPP's newest report, Broadening Horizons, How STEM in Society Programs Train Socially Responsible Scientists, Engineers, and Policy Leaders. My name, as I said, is Shobita Parthasarathy, and I direct the STPP program here. STPP is an interdisciplinary, university-wide program dedicated to training students, conducting cutting-edge research, and informing the public and policymakers on issues at the intersection of technology, science, equity, society, and public policy. If you'd like to learn more about STPP, please visit our website at stpp.fordschool.umich.edu. Before we begin, I'd like to thank the Kavli Foundation for funding this research. Kavli Foundation's vision is to advance science for the benefit of humanity, and it pursues this vision through its mission to stimulate basic research in astrophysics, nanoscience, neuroscience, and theoretical physics, strengthen the relationship between science and society, and honor scientific discoveries with the Kavli Prize. The impetus for this report was that STEM in society training is increasingly important as science and technology have become central to our daily lives. We need socially responsible engineers and scientists, as well as informed policymakers who understand the intersections between scientific developments, technologies, public policy, and society, and have the appropriate skills to make positive change. And now for today's event, we're hosting an important and exciting conversation about the role that STEM in society education programs play in creating more responsible scientists, engineers, and policy professionals, and how universities and funding organizations can support these programs. To give you a sense of today's agenda, we'll start with opening remarks from Brooke Smith, the Director of Science and Society at the Kavli Foundation. Brooke is unable to join us live today, but she recorded her short remarks via video.

**0:03:20.3** **Shobita Parthasarathy:** We'll then hear a short presentation from STPP research analyst extraordinaire, Erin Burkett, who led the research and writing of the report, and did a simply extraordinary job. And I want to also say that I want to thank all of the participants in this report, the people who filled out the survey that we did, as well as the participants, the interviewees, and the case studies. So Erin will hit the highlights of the report, and then she and I will have a short discussion with Lauren Budenholzer, who's the science and society specialist at the Kavli Foundation, where she collaborates with partners to implement effective strategies to engage the public in basic science and ethical issues born from scientific discovery. Then we'll open it up to audience Q&A. As we go along, feel free to enter your questions in the Q&A box and or upvote the ones that resonate with you. And to get us started, I'll turn it over to Brooke.

**0:04:24.5** **Brooke Smith:** Hi, everyone. I'm so grateful to be here. I'm sorry it's virtual. I look forward to watching your great discussion after the webinar is through. And first, big congrats to Shobita, Molly, and Erin for this wonderful accomplishment. I'm Brooke Smith of the Kavli Foundation, where I direct our Science and Society program. The Kavli Foundation was extremely honored to support this work and grateful for the chance to talk for a minute about this at the beginning of your webinar. The Kavli Foundation is a philanthropic foundation. We are based in Los Angeles, California, where our mission is to support science to benefit humanity. Our particular focus is funding basic science, specifically in the areas of nanoscience, astrophysics, neuroscience, and theoretical physics. Recognizing the importance of the connections of science within society, the foundation also has a program in science and society, which I lead. As our primary constituency here at the foundation are scientists doing research and work in our chosen fields, we are particularly interested in how we are enabling and empowering scientists to navigate the societal context of their work, whether that's discussing work with relevant communities, communicating their process or outcomes with the press, engaging in the public policy process locally, nationally, or internationally, or more.

**0:05:41.7** **Brooke Smith:** We specifically have been interrogating how to train scientists who identify as doing more basic science to be connected to society in a myriad of ways. We are interested in what we know about what works, how it can be improved. We also know there's not a clear distinction between basic and applied, and the reasons to connect with society and who within society you might even be connecting with can also be variable. So when Shobita and I were discussing a broader need to learn more about what we are really doing, what we're offering, and how it works, we were really delighted to support it. We hope this report will help provide a grounding in what we're doing, what can be done, what we can improve, and really get our arms around understanding what's happening. It's extremely rich with data and information about the work going on and salient in distilling some characteristics of what is happening or not happening. And I also very much appreciate the recommendations, which I know you'll cover in this webinar together and discuss. There's a couple of things that stuck out to me that I wanted to share as you get going, especially on the recommendation side. First, I was really intrigued by the fact that this report talks about perhaps we don't necessarily need more programs, and we might spend some time right now thinking about how to ensure our programs are effective, really drawing from the existing expertise that's out there to make programs impactful. I hear a lot from colleagues, scientists, leaders in the scientific community, if only we had programs to help scientists better understand the societal context or communicate better. And I'm always baffled by that because we do have programs. So I'm wondering what the real challenge is here. Is it that we don't know about them? Is it that we're not being effective? I know this report unpacks some of that, and I'm excited to hear about what you'll discuss in that regards today. I was also really intrigued by the idea that we need to be enabling the design, delivery, and evaluation of programs. From the funding perspective, this is something that also continues to baffle me quite a bit, that we assume these things happen because they're important, not because we're funding them. And as such, they end up happening off the side of desks or on people's volunteer time.

**0:07:49.3** **Brooke Smith:** And if we're not actually investing in and supporting the design, delivery, and evaluation of these programs, I don't think we can expect them to be quality. And I hope that this report and the discussions that ensue really elevate that conversation here. I'm also really interested in some of the recommendations and discussion around the interest in investing and building these programs so that they're part of the fabric of science and how we do science. A couple of things that relate to this were discussions around investment in leadership and leadership development, thinking about succession plans and what will happen. Many of these wonderful programs that do exist are labors of love of individuals. And when those individuals move on to other jobs or retire, what happens to those programs? And are we building the capacity and the generational support to keep those programs going? And also in the spirit, as the report recognizes the importance of making connections outside of the academy and how that's often not valued or incentivized and how important that is, and building into the infrastructure the need for academia to be connected outside of society, which is, of course, the very essence of what we mean by science and society and connecting science to these different audiences. So thinking about how to make that institutionalized and more sustainable is really important too. I know there's a number of other recommendations here that are really salient and relevant that you'll unpack, and I look forward to hearing about them. I'm really excited about what this report will do to inform our baseline discussion about what's really happening and inspire new discussions about where we can go from here and move together as a field. So thank you again to the team at Michigan, and congrats for this great report. And I look forward to hearing about your discussions.

**0:09:36.6** **Erin Burkett:** Just let me get situated here, and thanks Shobita for the introduction. Thanks everyone for being here and bearing with us. I am thrilled to be sharing some of the findings from our report with you all. Before I do that, I wanted to provide our definition of STEM in society. For this report and for our data collection, we defined a STEM in society program as any degree, minor, or certificate that emphasizes how science, technology, engineering, or medicine intersect with ethics, policy, or society. This did include both undergraduate and graduate level programs, as well as continuing professional education programs offered by higher education institutions. Some example program titles include science policy, engineering ethics, science and society, and bioethics. Next slide, please. Here's an overview of our data collection and mixed methods research approach. To assess the landscape, we first identified and described nearly 250 programs across the US. These programs are hosted by 90 different universities. We used thematic analysis of their written website content to explore how programs are describing their learning objectives, their DEI goals or commitments, and alumni job outcomes. We also conducted a program survey to learn more about when programs were founded, their size, and how they are funded.

**0:10:59.6** **Erin Burkett:** And last but not least, we conducted five in-depth case studies and one program snapshot, which were informed primarily by interviews with program leaders, faculty, staff, current students, and alumni. These case studies offer a ground-level view of the opportunities and challenges that some in society programs experience and how they impact student and alumni careers. Next slide, please. We found that the majority of some in society programs are located at R1 institutions, which means students at other types of universities and colleges do have limited access to this kind of training. Programs are primarily funded by a combination of university and unit commitments and student tuition. This was an interesting finding because, as I'll discuss more in a bit, STEM and society programs often contribute to universities in ways that don't translate into an increase in program revenue. We also found that many programs were founded fairly recently, within the past 25 years, which could speak to the growing interest in the societal and ethical aspects of science and technology. Next slide, please. From a topical perspective, we found that STS programs, or science and technology studies, made up more than half of all STEM and society programs. STS emphasizes how science and technology are embedded in social systems, so this makes a lot of sense. We also found that STS programs are training a combination of humanists and social scientists through their graduate-level programs, as well as reaching undergraduate STEM students by offering STS minors. These undergraduate minors are especially important for training future engineers and scientists who should be considering technological and scientific development through a social lens, and in turn, hopefully make more responsible and ethical professional decisions. Despite the need for STEM and society learning opportunities, we did find limited program diversity among undergraduate and continuing professional education programs. The lack of programs available to undergraduates is important because this is a critical stage of learning and professional development for students.

**0:13:05.4** **Erin Burkett:** It's an ideal time for STEM and society training because undergraduates and STEM majors in particular are beginning to form their professional identities and have it become fully specialized or rooted in professional norms yet. Unfortunately, many undergraduate students only have access to STEM and society coursework electives and no opportunity to pursue a full-time STEM and society degree. And just briefly, what this graphic is showing you is within each of the topical fields we identified, kind of the breakdown within each of whether their programs are offering, offered to undergraduates, a mix of grads and undergrads, graduate and professionals, et cetera. Next slide, please. This slide lists all the case studies. So we had five case studies and one program snapshot to better understand the challenges and opportunities faced by these programs and how they impact students and alumni. The cases represent a range of subfields of study within STEM and society. I do want to acknowledge, however, that our selection is limited to R1 schools and programs that emphasize science, technology, or engineering policy, with the exception of the STS department at Virginia Tech. Because the neuroscience and public policy program at UW-Madison, the University of Wisconsin-Madison, is quite small and had a much smaller pool of potential interviewees, we included it as a briefer program snapshot instead of a fully in-depth case study.

**0:14:25.7** **Erin Burkett:** And this breakdown is showing you when the programs were founded, what their student audiences are, and what types of degrees they offer. Next slide, please. I'd like to start by highlighting two major takeaways from the case studies. The first is that STEM and society training is highly beneficial and career altering for many students, especially those who previously planned to pursue strictly STEM careers. This quote is from a Carnegie Mellon undergraduate pursuing both an engineering degree and the additional degree in engineering and public policy that EPP offers. Here, they're discussing the influence of the EPP degree on their career plans. I've definitely entertained the idea of just straight up going into government and working in this tech policy space. I don't know if I will, but I think it's really interesting because EPP has this macro look on things, but I could see how I could apply my technical skills to better society. Versus if I hadn't done it, I probably would have just gone straight into industry and R&D, research and development, without, or research and design, without even thinking about it, EPP student. We did find similar sentiment from students and alumni across the case studies.

**0:15:37.5** **Erin Burkett:** In many instances, students who had never considered pursuing a career outside research get partway through their graduate degree and realize it's not what they want professionally. So a STEM and society degree offers them a way to pivot and use both their technical and desired STEM and society skills. We also need STEM and society trained researchers in technical fields. So sometimes these programs and alumni I spoke with say, "I'm staying in research or I'm staying in academic or technology development, but now I have a different way of looking at my work or a different approach." Next slide, please. Relatedly, we found that interviewees across the board agree that students pursuing STEM and society training need better and improved access to specialized career guidance. However, most programs in the universities as a whole lack student support staff who understand the potential career pathways for students with this training. We found this to be true for both students pursuing non-academic careers and careers within academia. For example, within academia, some students who graduate from these programs have trouble finding an academic home. They're not sure which kind of department they belong in. Am I an engineer? Am I a social scientist? Where do I fit?

**0:16:55.0** **Erin Burkett:** Next slide, please. The case studies also highlight common challenges and opportunities faced by STEM and society programs. So at the program level, one commonality that emerged is that STEM and society programs are grappling with a recent boom of interest in contemporary science and technology issues. Program leaders, faculty, and staff are observing their STEM-trained peers pursuing STEM and society-type projects, often without acknowledgment or basis in longstanding knowledge. Reactions to this are mixed. This quote illustrates the concern with STEM-trained faculty assuming they can pivot into STEM and society work without any formal training. I think that was the last one, actually. Sorry, Molly. Next slide, please. I'll read this quote, I do think that a lot of the "STS work" that's going on, and that's STS work in quotes, that's going on in associative fields like engineering education in some places, has a lot more to do with making engineers feel better about themselves than it does actually make meaningful change. So if there's one takeaway, stop throwing money at engineers to do things that they haven't thought about, haven't really considered other perspectives on, and aren't equipped to do. I will say that other interviewees were more cautiously optimistic and excited by the growing opportunity to collaborate across fields, but still cautious of the concern that STEM and society experts will bear the brunt of the organizational aspect and bridging fields.

**0:18:39.2** **Erin Burkett:** So going into some recommendation highlights, the report does include 37 specific recommendations for how to support and grow STEM and society programs. Since I can't go all over all of those now, I'll just share one for each of our target groups. So our recommendations focus on national organizations interested in financially supporting these programs, university leadership, and STEM and society program leaders. For funders, we recommend developing the STEM and society ecosystem by creating long-term funding opportunities that support and strengthen existing programs rather than starting new programs. In many instances, longstanding STEM and society programs provide the intellectual engine for critical understanding of how science, technology, and related public policies both shape and are shaped by societies. For university leaders, we recommend encouraging STEM units to collaborate with humanities and social sciences, faculty, and staff when they're developing their STEM courses, programs, or research activities. This would ensure that STEM and society training is rigorous and not co-opted from less powerful campus units. And finally, for program leaders, we recommend enhancing career support. This is particularly important for students pursuing non-academic career paths, but as I mentioned earlier, it is important for both groups. One way we recommend pursuing this is by leveraging data. One example is improving alumni tracking and leveraging alumni networks to help students understand their professional options. That wraps up my presentation. So now we're going to go into a discussion and I'll invite Lauren and Shobita to join us on screen for that. And as a reminder, as they do that, we will save time for audience questions. You can either enter those in the Q&A or if you look at the Q&A and you see a question that's already there you want to have us discuss or answer, there should be a little thumbs up or upvote feature.

**0:20:57.7** **Lauren Budenholzer:** Thank you so much for having me. Shobita, did you want to say anything before I get us started on some questions?

**0:21:04.3** **Shobita Parthasarathy:** No, I mean, except to again thank Erin for the extraordinary work that she did. It's incredibly comprehensive. And for those of you who've taken a look at the report or will do so, you will see how much labor. And I guess the other thing I'll say, and I know that there are many people here who participated in the study in different ways, and I want to thank all of you, especially those who participated as interviewees in our case studies.

**0:21:37.9** **Lauren Budenholzer:** Great. So I want to just start off by asking about opportunities to integrate these programs into STEM and these recommendations. So often STEM work happens separate from STEM in society work. And I was curious if you could talk a little bit about the opportunities you see to bridge that gap that emerged in the report.

**0:22:03.3** **Shobita Parthasarathy:** So maybe I'll take this one first, and then Erin, I would love to hear your perspective. I think the challenge, and it was really well highlighted by one of the quotes that Erin highlighted in her presentation, but it's throughout the report, is that there is often, I mean, to be blunt about it, there's often a kind of expertise problem that is, that often STEM experts don't see social scientists as humanists as having expertise in STEM and society. And often neither does the wider world. I often think about how during the pandemic, we often turn to epidemiologists or biostatisticians to ask questions about vaccine hesitancy when there have been multiple STEM and society types of books. And so I think that's a big problem. And what that often means, as Erin mentioned, is that then you have STEM programs often reinventing the wheel. So you see this, for example, in the development of public interest technology programs around the country, for example. So that's one of the big issues is sort of how do you get around this expertise problem? And I think there's one thing that I think folks who are running these kinds of STEM and society programs might point out is that one of the issues is sort of thinking about how you reframe the problem.

**0:23:43.0** **Shobita Parthasarathy:** That is, that it's, you know, when you think about these things, they're social questions rather than technical questions. But I think and, you know, one way into it is, I think, by developing, and sometimes this is unfortunately this takes some time, but sort of developing capacity. And sometimes, I mean, I'm partial because as an instructor of graduate students, you know, in STEM, I hope that my students who go on to faculty positions in STEM departments will then be better collaborators, will reach out to the humanities and social sciences for this kind of expertise. But that takes some time. And that is the place, I think, where university administrators can play a role, funders can play a role to kind of help lift up the role of the humanities and social sciences in when you want to talk about science and society to realize that it is not, you know, that there is distinct expertise here that needs to be highlighted. Because if that's not done from my experience, and I, and it certainly resonated with some of the people that were interviewed for the report, the problem is that when it's a faculty, you know, it's a pure faculty to faculty kind of conversation, that becomes difficult with folks who are already well established in their careers, especially STEM faculty well established in their careers, it can often be quite difficult to build those bridges at that point.

**0:25:21.8** **Lauren Budenholzer:** Erin, did you want to add anything?

**0:25:25.0** **Erin Burkett:** Yeah, I would just add that if this is something that folks watching are particularly interested in, and you don't have time to read our entire report, I would point you towards the case study of the University of California Santa Cruz's Science and Justice Research Center. The folks there, faculty, staff, students, have been doing this work and really intentionally trying to kind of bridge those divides to their work. So in addition to offering a graduate certificate, they host a lot of community conversations, and I can't do it justice in this moment, and they've published, folks affiliated with that program have published multiple papers about their reflections on how it's gone and the work that they're doing, but they really do have both a short-term vision and activities of both training students and changing the culture of UC Santa Cruz by bridging these disciplinary divides. So I would point you to that case study and that program in particular if you're interested in kind of one program that's intentionally really going about that. It's a lot of work, and it's a slow-moving process, but I think of all the key studies, that's the one that would demonstrate a program that's tried that or maybe is further along in that process.

**0:26:55.3** **Lauren Budenholzer:** Right, thank you. So I really like, Erin, how you brought us back to the report, so I'm curious, as you were doing this work for both of you, what stood out the most to you about the findings? Was there anything that was surprising, anything that was not surprising? I'd love to hear your thoughts.

**0:27:16.5** **Shobita Parthasarathy:** Erin, why don't you start out?

**0:27:18.3** **Erin Burkett:** Sure, and I know Paul apologies again for our video not working, but one thing Brooke had mentioned in her introduction was the importance of leadership and in the stability of these programs, and I think as a researcher, that stood out to me in terms of oftentimes, and not every program, but for some STEM and society programs, they often have a very dedicated founder who's really committed to keeping the program running and through creative fundraising or staying in a director position for quite a while, making sure the program has longevity, and that can also be made a little more complicated if the program itself isn't a typical school or department doesn't have that built-in security, so when you can think of research centers coming and going at different universities when there's a flux of money, and then after funding cycles out, maybe unfortunately programs go away, and that certainly happens across higher education, but I think STEM and society programs may be in some ways more vulnerable to that, so that stood out to me, and that's one.

**0:28:40.5** **Shobita Parthasarathy:** Yeah, I mean, I guess I would say, and we are going to try to figure out a way to share the link to Brooke's short remarks, but I think on this point, that is a real challenge, and that's in some ways a challenge for all interdisciplinary programs. I think, you know, I mean, each university is a special snowflake that has unique ways of getting tuition from students, but almost all programs that I know about, right? You get direct revenue kind of from the students who take the courses and especially students in the majors and the minors, and that becomes really hard for STEM and society programs because there are so few that are departments, right? We, one of the case studies is of Virginia Tech science technology and society program, but those are super, super rare, and it's quite hard to get to that point, and so as a result, then there are no clear revenue streams, and in other interdisciplinary programs, you might have revenue streams where, you know, you're talking about the combined interests of, you know, departments or colleagues who are in the same unit, the same college in a university.

**0:30:08.6** **Shobita Parthasarathy:** But in our case, we're often trying to bridge, you know, we're in a school of public policy. We have to bridge with the program in biomedical sciences or the engineering college, and so those questions about where the funding comes from becomes a huge challenge, and, you know, over the years, I've been part of innumerable conversations, not just where I've had to justify our existence, but where we're seen as kind of, you know, why are you here? Why are we providing this service to other units on campus when they're not providing funding for us? So those sorts of challenges are real, and I think contribute to what Erin observed, and it's unfortunate because, you know, even though STEM and society programs like this are increasingly crucial, and we see that because there is a proliferation of these kinds of programs, it prevents the real expertise in those issues from being, from really being stable. Lauren, you're muted.

**0:31:27.6** **Lauren Budenholzer:** Thank you, apologies. Could you elaborate a little bit more about that contemporary context you were describing? So we have this current increase in interest in STEM and society training, but what would happen if scientists and engineers weren't trained in this type of work, in ethics and societal contexts? Could you talk about the value in that?

**0:31:52.2** **Shobita Parthasarathy:** Yeah, I mean, well, of course we are in a world in which scientists and engineers are not trained by and large in these issues, right? And I think we see the consequences. Perhaps the biggest consequence is a misunderstanding or a lack of understanding of the impacts of the technologies that they produce and the science that they do. And I think there's an assumption that if you have good intentions, then your product will be good and useful. There's also a misunderstanding that by having good intentions and doing socially important work, that it will actually have public benefit. And I think in the political crisis that we're experiencing right now, that is a big part of the disconnect, right? Is that for so many STEM professionals, they see that from their perspective, they're doing crucial, socially important work, but it's not actually translating to citizens. And as a result, citizens ask, "What is STEM doing for us?" And that leads to an erosion in public trust, right? So for me, that is the most crucial part of this picture. And the other part of it is, of course, that at the end of the day, we want STEM to benefit society, right? And in order for it to do that, you need people who understand that the relationship between STEM and society is complicated, at the very least.

**0:33:46.0** **Lauren Budenholzer:** Erin, did you want to add anything?

**0:33:50.4** **Erin Burkett:** I would just add that something I kind of already mentioned in the presentation, but that we, it's not always that we need every scientist to go off and become a policy maker, right? Like there's different roles for different people. And I think something that struck me when I was interviewing alumni, especially those who have maybe been further out in their careers, I could think of someone maybe does have a stronger STEM background, but then went back to school, got STEM and society training. When they're in the room working in, you know, name an agency, often they're the only person in the room who will ask these sorts of questions. And I heard time and time and again from different interviewees saying, you know, having a STEM background does give me legitimacy in those rooms so people will listen, but there's still a lot of work to be done and momentum to build to make sure they're not the only voice in the room who's asking those questions. And I don't think, I want to make sure we're clear about the argument that we're not saying every scientist should go into policy. Like I shared, I didn't share, but I could share numerous quotes in the report that say, you know, this is a different way I think about my research. I'm still staying in academia or I'm working in R&D, but I think about it differently and that does set people apart, helps them get jobs sooner, advance faster than their peers. So it's not just good for, you know, society as a whole, it's also like good for folks in their careers. So there's some different nuances there I just kind of wanted to point out.

**0:35:29.1** **Lauren Budenholzer:** Thank you. I'm going to ask one more question before I hand it off to Molly to answer some of the questions in the Q&A. So if you have more questions for Shobita or Erin, please feel free to put those in the Q&A. We will get to those shortly. So you both touched a little bit on capacity building. And so I was hoping you could comment a little bit, either both or whoever you think is most poised to answer the question, to build capacity, deliver these programs, build evaluation in, whether that takes the form of fostering leadership, succession plans. I'd love to hear a little bit more about that. Shobita, do you want to get started?

**0:36:12.7** **Shobita Parthasarathy:** Sure. I was going to turn it over to Erin, but.

**0:36:17.0** **Lauren Budenholzer:** By all means.

**0:36:18.6** **Shobita Parthasarathy:** But I will say one thing, which is that, you know, government and philanthropies have done a lot to shape incentives for STEM researchers in particular to seek out partners like us, philosophers, you know, humanists and social scientists. It's sometimes created perverse incentives and perhaps problematic, you know, power dynamics in collaborative research teams. But it has had an impact in terms of having STEM researchers look outside of their disciplines. And I actually think the next step then is to think about, A, how do we ensure that these, you know, what role can funders play in ensuring more equitable relationships? That's also true for university administrators. And also, what role can these funders and university administrators play in actually centering humanistic and social scientific perspectives in technical, you know, discussions in science and engineering research? You know, for example, if you take seriously that so much of the dynamics of the relationship between science and society are baked in in terms of how you frame the question, then what you really need is humanists and social scientists at the beginning. And so while I answered that by talking about research funding, I did so on purpose, because I think that if you can start to generate more research dollars for this kind of work, that will help to inspire and actually fund a lot of the educational programs that we're talking about. Erin, anything to add?

**0:38:18.9** **Erin Burkett:** Yeah, I would add just another reference to the report recommendations, which is that while we do have recommendations for STEM and society program leaders and funders, the third group is university leadership. So I think part of the reasoning for looking at other groups besides program leaders themselves is needing to relieve some of that burden or recognizing different power dynamics and how different groups can incentivize. So she'll be the talk about funders incentivizing, improved collaboration, and university leaders can also do the same. And we have, you know, several multiple specific recommendations in the report about that, but I'll just leave it there.

**0:39:02.1** **Lauren Budenholzer:** Thank you so much. And thank you for the opportunity to be a part of this discussion. And I look forward to seeing everything that comes from this work. And I'm going to hand it off to Molly to continue with the Q&A.

**0:39:15.8** **Molly Kleinman:** Thanks so much.

**0:39:16.4** **Shobita Parthasarathy:** Great. And Molly, I neglected to introduce you. So I will just say that Molly Kleinman is our managing director extraordinaire for the science, technology and public policy program at Michigan.

**0:39:31.5** **Molly Kleinman:** Great. Thanks so much. Hi, everyone. Yeah, so we've got a few great questions from the audience today. To start out, Erin, you had started talking a little bit about careers and workforce support. So one question we had is it feels like higher ed is increasingly being pushed to focus on workforce readiness. Is there an opportunity here to combine some of these areas with growing STEM student skills in ways that support explicitly support their career entry as well?

**0:40:02.6** **Erin Burkett:** Yes, and I think programs are doing this, even if they're not using the term workforce readiness, at least so I can think of the or maybe they are too, but I can think of a couple of the case studies where this came out in terms of especially programs who are trying have more recently established degrees, trying to justify that because creating a new degree I learned through this process is really complicated. And it's kind of a state to state process of oversight and justifying why does our state, our university as a whole need a new degree. So having this workforce readiness piece is a really big, I think big piece of that puzzle trying to think I mean, the answer, yes, short answer I'm trying to think of anything else.

**0:40:49.5** **Shobita Parthasarathy:** Erin, I thought you were gonna talk about all the CPE stuff too, which is, I know something that you feel so was like a clear finding for you and you talked about it in the presentation.

**0:40:59.8** **Erin Burkett:** Yeah, I guess I could just speak to that in the sense that some of these programs are really supplementing the primary degree students are doing and helping them have those more on-the-job skills. So I'll go back to the engineering and public policy department at Carnegie Mellon. So their additional degree in EPP is specifically for students who are already pursuing a bachelor's in engineering in another engineering field, civil, mechanical, what have you. And they are seeing that through the process of interdisciplinary training, which includes working in diverse teams, looking at engineering problems from a social perspective, they are ahead of their engineering-only peers when they graduate and able to advance faster in their careers because they have those skills. When they're at a job fair, it's like, how do you, two engineering graduates from Carnegie Mellon, incredible students, well, when they have this additional EPP degree, they have more, they're ready to hit the ground running, so to speak, a little bit faster in their jobs. They can write better, work in teams, they have a more holistic way of thinking that otherwise could take, may take certain engineering students right out of undergraduate school maybe longer to gain in their career. So I absolutely, I think the question's spot on. And I think from other parts of the case studies, I think making that really explicit is key because higher education, a degree is very expensive, and something that came up a lot in the interviews was the difficulty of sometimes marketing a STEM and society degree or certificate or minor to students and their parents. A school like Arizona State University really is a minority, Hispanic-focused university trying to make sure their student body represents the state of Arizona demographically speaking. And they reflected, it's sometimes hard, how do we compete with programs that have been around 100 years, right? Like we have a STEM and society, what is that? How do you justify that to a parent? Well, there's your answer, like how show the data on these are the skills you're gonna get and the jobs and careers you can have.

**0:43:34.5** **Molly Kleinman:** Great. So this question, I'm gonna just read it. I'm not gonna sort of paraphrase it at all. As someone from STEM who's tried to reach out to STS departments for collaboration, I found it nearly impossible to build collaborations that are meaningful because it seems that they're often misaligned goals and an underlying mistrust going in both directions between the STS scholars and scientists. Are there any recommendations for how to build this trust and break through to have meaningful collaborations? Or is it really just waiting for the next generation of STEM and STS scholars who will be more capable of collaboration?

**0:44:11.2** **Shobita Parthasarathy:** That is a great question. It is a perennial challenge. And it is a perennial challenge. I cannot tell you how many interdisciplinary projects that I've been a part of. And I keep hoping that I've found the secret sauce. Well, I guess where I would start is to say, and it sounds like that's true from the question, but is to acknowledge that distrust and to also acknowledge the different positions that people come from, the different ways they understand problems, and perhaps also talking about kind of these failed efforts and the frustrations. I think what I've learned is, and some of it actually I even learned this week, is that it's not just that STEM, we're sort of creating an artificial distinction, but the STEM on the one side and STEM and society on the other side, and it's not that cut and dried. But I think that there is an assumption that there are sort of shared ways of looking at the world. And I think that that's not true. Our disciplinary identities and other identities shape the way we see the world.

**0:45:40.8** **Shobita Parthasarathy:** And I think we don't often recognize it, much less reflect on it. And so that's certainly an important place to start and to try to go through the process with extreme humility and understanding all of our knowledge is partial and that there are these tensions and that there are these, there's real reason for this mistrust. And also, one thing I will also add is that to be real about the fact that STEM researchers tend to have greater institutionalized power. And that often puts STEM and society researchers on the back foot and that's often a reason for the distrust. So to the extent that you can kind of show that there's an understanding of that and that there's an understanding of that partiality, I think that can be really helpful, you know, I had an, as I said, I even this week, I feel like I learned more about it, and in some ways in the sense that, you know, one of the things that I heard actually from a, from a couple of students was talking about kind of in some STEM disciplines there is, you know, not as much comfort, let's just say with thinking about and poking at kind of the different dimensions of STEM and some of the problems and some of the challenges and some of the assumptions. And that, you know, I think I always assumed we all wanna understand all of the different risks and benefits, and I think that's not always the case. And so I think on the part of, of STEM and society researchers, we can also understand that, you know, some disciplines aren't necessarily trained even to think about those sorts of drawbacks. But rather to think about, you know, innovation as progress, innovation is, you know, good and we don't wanna talk about all of those messy things that can, I think, be one of the things that STEM and society researchers can also approach these kinds of collaborations with a little bit more understanding as well.

**0:48:10.8** **Molly Kleinman:** Erin, did you wanna add anything?

**0:48:14.7** **Erin Burkett:** I'll just, I could share some insights to that question that interviewee shared with me. And I mean, the first one that just jumps out is that, like, that building that trust process, it does take time. And, you know, this one kind of like broke my heart. I was like, oh, no. I think, yeah, once you can find the right people, sometimes it's good to you know, recognize that not every collaboration will work out every relationship, but like, stick with the ones that do and keep working with those folks. I do think there's some, I'll remind folks of the, well, I know there's lots of resources out there, kind of like how to, you know, break down. I think language is big. So that's another one that I'll pull from the interviewees is just like, even how we talk about our disciplines and, you know, one, the same word could mean totally different things and different disciplines, and then I'll point back to the science and justice research center at UC Santa Cruz, which has written a couple reflective pieces about this that are published articles. And if anybody has trouble looking for them, you can reach out to us. But I can help you with those, or they're referenced in the report as well, but yeah, there are, there are resources out there that's maybe not the most encouraging, but it does take time and practice as kind of the short piece to that.

**0:49:40.0** **Molly Kleinman:** But it is real. It's a real.

**0:49:42.8** **Erin Burkett:** It's a real challenge.

**0:49:42.9** **Molly Kleinman:** Yeah. All right. So I think this is gonna be our last question. Erin mentioned in the presentation how getting training in science and society has helped scientists who stay in science succeed in their own goals, does the report contain data oddness, or can we talk about other ways to support the argument that many folks have been making? I think many of the people who are advocating for this kind of work have been making that it's not just something scientists should care about from a values perspective, but also something that will actually improve their science.

**0:50:19.8** **Shobita Parthasarathy:** Erin, you wanna start, and then I can follow up?

**0:50:19.8** **Erin Burkett:** Sure, yeah. I'm just kind of rereading one part of that one. Give me a second, please. I don't think I, I don't know, I don't think our report contains data on this, but it's a really interesting and important question, I think would be my short answer, there are some anecdotal statements about that in the report from some alumni who said, "Yeah, this has absolutely changed the way I work my interest. I found my niche," like some more anecdotal stories like that from our interviewees. But I do think that would be very interesting follow up study

**0:51:08.3** **Shobita Parthasarathy:** And I'll just say briefly, you know, I'll talk about a couple of cases and, you know, they're just individual cases. But we've had from our program a number of students who have stayed in academia but have gone on to hybrid positions. That is, you know, we have one graduate who's now an associate vice provost for sustainability at SUNY Stony Brook who, you know, kind of started out as a climate modeler and kind of incorporated all of these ideas into his own research and certainly his teaching. He also spent time as a policy fellow and then went back into academia and now is sort of doing higher ed administration. And then another alum who is a data scientist who went to our program and is now a leader in industry, but who does cybersecurity work, but incorporates, you know, STEM and society ideas into his cybersecurity work that he thinks has really helped him not provided insights that enable him to do the work better. But I agree. I mean, I think, you know, I mean, I think about research in a particular way. I think this it would be interesting to kind of collect from all of these different programs the ways in which it changes science. And I'll just say finally that, you know, we talk in the report about the kinds of students that we're talking about. Today, a lot of our conversation has focused on STEM students, but, you know, our education and I think a lot of the programs are really educating a wide variety of students from humanities, social science, public policy, as well as STEM. So we are out of time.

**0:53:16.4** **Shobita Parthasarathy:** I think we shared the link to Brooke's intro in the chat. I'm so sorry that it didn't work out for us to listen to it live. But I encourage you to watch that video. It's only five minutes. And I think her engagement has been so vital for us. And I'm looking forward to how Kavli can help us support these kinds of programs in the future. And, you know, for those of you who are interested in this kind of work, you can feel comfortable contacting me, but also please contact us at the STPP program that is stpp@umich.edu. And then I just want to really thank you again for joining us to learn about these programs. We're happy to answer follow-up questions. The webinar recording will be uploaded to the report website by the end of next week. And when you visit our STPP website, you can also sign up to hear about other kinds of reports and publications and other work that we're doing. If you go to our website, you can find that under the news tab. Thank you very much. And we'll see you soon. Have a good evening.

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