



Achieving STEMM Equity & Excellence: Communities and Schools

Hosted By - New York Hall of Science

April 18, 2023 | 1:00 - 5:00 pm

Convening Summary and Readout

The STEMM Opportunity Alliance and our host, the New York Hall of Science (NYSCI), held a convening centered around Achieving STEMM Equity and Excellence in Communities and Schools. The event brought together STEMM experts from across the ecosystem to discuss the role of community, informal, and out-of-school sectors in creating equitable STEMM learning opportunities. The event included galvanizing remarks from speakers – including a video address from Governor Kathy Hochul of New York. The session also featured facilitated workshops that provided participants the opportunity to help co-construct the SOA national strategy for achieving STEMM equity and excellence by 2050.

Plenary Session 1:

Participants heard from key leaders of the STEMM equity movement and K-12 space, including a keynote address from AAAS President Gilda Barabino. Speakers included the following:

Margaret Honey, President & CEO, New York Hall of Science: Dr. Honey emphasized how fundamental informal learning is in STEMM education. She spoke to the long-standing history of the New York Hall of Science as an institution of community learning and a leader in bringing inclusive approaches to STEMM. In Dr. Honey’s words, “experiential, playful learning enhances the development of scientific learning.”

Sudip Parikh, CEO, American Association for the Advancement of Science: Dr. Parikh spoke to AAAS’ 175-year history and outlined a vision in which children reflective of the diverse makeup of the country will feel a sense of belonging in the scientific community. He described the movement as a cathedral building effort across the country – built one brick at a time.

Sam Gill, President, Doris Duke Foundation: Gill underlined that a science that is in touch with and led by community will be more inclusive, effective, and excellent. As CEO of the leading funding institution supporting SOA, he also recognized the breadth of the philanthropies partnering with SOA, which he said demonstrates the power of the STEMM equity agenda. Gill also recognized the new partner organizations joining SOA’s coalition of 100+ partners.

Gilda Barabino, President, AAAS: Dr. Barabino spoke to the remarkable pace of scientific advancement and discoveries in the 21st century as well as the tumult and persistent inequities which pervade the STEMM ecosystem. She pushed participants to reflect on the legacy they will leave on the STEMM ecosystem and described STEMM equity as the “primary scientific moonshot of our times,” emphasizing that a diverse and representative scientific enterprise is foundational to realizing solutions to the biggest challenges facing society.

Breakout Sessions

Following the plenary session, participants engaged in an interactive STEMM reflection activity led by the New York Hall of Science staff, in which they recreated formative childhood memories of scientific learning and enrichment. This exercise was followed by ninety minutes of design workshops, in which participants worked together to identify key goals for improving equity in STEMM via changes in communities and schools, and specific strategies needed to achieve them, in each of five topic areas:

- K-12 Educator Preparation and Diversification
- Access to Evidence-based Instruction and Learning
- Girls and Women in STEMM
- The Role of Museums, Zoos, Community Organizations, and Informal Programs
- Data and Metrics for Tracking Progress toward Equity

These discussions leveraged a draft discussion paper developed by SOA – a strawman framework for a National Strategy on STEMM Equity and Excellence – and aimed to amend and iterate on this framework with input and ideas from key field experts and stakeholders. Key themes and relevant ideas from each group are captured below.

Breakout Session Group 1: K-12 Educator Preparation and Diversification

This conversation allowed participants to discuss how teacher preparedness and diversity impact the ways in which STEMM education is consumed by students.

Key Themes:

- The current teacher recruitment apparatus assumes a smooth, linear career path for teachers. It doesn't consider how to address barriers that may keep more diverse candidates from joining the field. The cost of master's degrees, the rigor and cultural relevance of course work, the need for family support, the cost of certifications and credentials, and other obstacles must be addressed at a systemic level to further recruit and retain diverse STEMM educators.
- Silos within the STEMM world need to be broken down. There's a desperate need for cross-pollination between subject areas that is reflective of how STEMM fields interact in the real world.

- All teachers should be encouraged to think of themselves as STEMM educators. Training should reflect this new, innovative mindset.
- Though accessible to many different communities, community colleges often lack the resources to properly train and develop STEMM teachers. Investments should ensure that those wishing to become STEMM educators can do so at any level of postsecondary education. Community colleges serve a wide range of diverse individuals, many of whom come from communities that are critically underrepresented in STEMM fields.
- STEMM subjects and concepts are oftentimes taught in a manner that encourages memorization and regurgitation. Educators should be given the tools to develop innovative ways for students to engage with and understand concepts.

Breakout Session Group 2: Access to Evidence-Based Instruction and Learning

This session sought to uncover best practices for providing evidence-based instruction and learning opportunities to STEMM students. The conversation aimed to reconstruct how STEMM subjects are taught and to highlight innovative ideas for improvement.

Key Themes:

- As in other breakouts, participants discussed how current education practices over-emphasize memorization and regurgitation. These approaches should be discouraged – instead students should engage in hands-on learning experiences that allow them to interact with and gain a deeper understanding of concepts.
- Educators need to share their experiences with one another. An apparatus should be designed that allows for knowledge sharing to highlight which learning techniques prove most effective. This would need to be tailored based on the circumstances of students, but it has the potential to serve as a meaningful springboard for innovation.
- Teachers need to be empowered to try new teaching methods. Empowering teachers to do so would require that some standards be reevaluated – standards for success need to be expansive so that the needs of different students are taken into account.

Breakout Session Group 3: Girls and Women in STEMM

This conversation explored a number of meaningful approaches to recruit, support, and retain girls and women in STEMM fields.

Key Themes:

- To increase the representation of women in STEMM, we must start by inspiring interest and belonging at an early age. Parents must be equipped to better embed STEMM into play at an early age. Parents should be made aware of the importance of STEMM and the varying ways to introduce STEMM skills to children.
- STEMM educational and professional spaces are often uninviting to girls and women, making pathways difficult to navigate and deterring persistence in STEMM degrees and

professions. We must work to make substantive changes to systems to ensure that they present far fewer barriers that hinder the ability of women and girls to thrive. Bias must be rooted out to ensure that women and girls are given the proper tools needed to have successful STEMM careers.

- The ecosystem currently lacks qualified, diverse STEMM teachers that can inspire students, due to, among other factors, the gap between teacher pay and pay in other STEMM professions. We must consider new ways to incentivize more diverse STEMM professionals to teach STEMM, through novel ideas like offering loan forgiveness and mentorship opportunities.
- STEMM is presently taught in a manner that intentionally weeds students out. Better support is needed to ensure more people are able to pursue their passions in a sustainable manner.

Breakout Session Group 4: The Role of Museums/ Zoos, Community Organizations, and Informal Programs

Participants in this group collaborated to highlight the important role that museums, zoos, community organizations, and other informal programs play in fostering an appreciation for STEMM. The conversation centered around how to further empower community entities to help attract, retain, and ensure the continued success of diverse students in STEMM fields.

Key Themes:

- Children should be encouraged to think of themselves as scientists at an early age. This instills a sense of importance and accessibility in STEMM fields. Community organizations, zoos, and museums can play a pivotal role in sparking this interest.
- Centering STEMM skills rather than focusing on curriculum and content at an early age can help ensure STEMM is more desirable for kids.
- A more holistic approach must be taken to STEMM education. Additional actors who can effectively and creatively increase interest in STEMM (museums, zoos, community organizations, etc.) should be empowered and supported by schools to engage individuals. Other organizations are needed to bring about interest in STEMM and should be empowered to do so.
- STEMM needs to be made enjoyable so that children are excited about their continued STEMM education. If kids have fun when participating in STEMM activities, they'll likely have a more favorable perspective on STEMM subjects.
- Trade jobs should be considered a reasonable pathway for STEMM careers. It is critical that a broad collection of occupations be viewed as STEMM jobs.

Breakout Session Group 5: Data and Metrics for Tracking Progress toward Equity

This conversation served as a springboard for idea generation and considerations for how to ethically and effectively monitor data as it pertains to STEMM equity.

Key Themes:

- Measuring equity first requires defining what is meant by equity, and that definition must be expansive and reflective of the communities it describes. Holding listening sessions with communities may serve as a way to glean what they define as equity.
- Communities should play a pivotal role in what type of data is collected and how it is utilized. This will include ensuring that data readouts are digestible, interactive, and accessible.
- It is just as necessary to highlight systems that do not work as it is to elevate those that do. Acknowledging failures may help inform better program design.
- Qualitative data should receive just as much attention as quantitative data.

Plenary Session 2:

Kathy Hochul, Governor, New York State: Governor Hochul, who addressed convening participants via a video, underscored the need for an outstanding, diverse, inclusive, and equitable STEMM ecosystem in New York in order to harness the billions of dollars in new federal funding flowing into the state for industries such as semiconductor manufacturing. The governor championed STEMM education as a building block in the pursuit of equity and excellence, remarking that “we know the jobs of the future will require skills in coding, engineering, and technology. It starts with STEMM education. The key is focusing on introducing our students to great opportunities. This will ensure we have the talented workforce we need to continue our nation-leading work and ultimately drive economic growth and prosperity for generations to come.”