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# Systematic Approaches to STEM in Out of School Time in Chicago: Proceedings Report

Meeting Date: February 28, 2014 Chicago Community Trust

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Report Date: April 15, 2014

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THE BRINSON FOUNDATION

The Albert Pick, Jr. Fund

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### **Meeting Vision:**

To bring together Chicago's leading funders and STEM OST networks to review the findings that came from the Chicago STEM Pathways Cooperative final report, and begin to strategize how both the STEM and funder communities can work together to act upon the report's findings and recommendations

### **Meeting Goals:**

1. To bring attendees up to date on the findings of the Chicago STEM Pathways Cooperative
2. To learn about broad-based OST STEM initiatives in Chicago generally
3. To consider systematic models for investing in STEM and out-of-school time from other cities
4. To enable funders to talk together about what a meaningful city-wide strategy for STEM OST would consist of and to strategize on ways to enhance and transform STEM OST through collaborative efforts
5. To establish action steps to be taken by the funding and STEM OST communities in order to implement the ideas harvested during the meeting

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## Proceedings

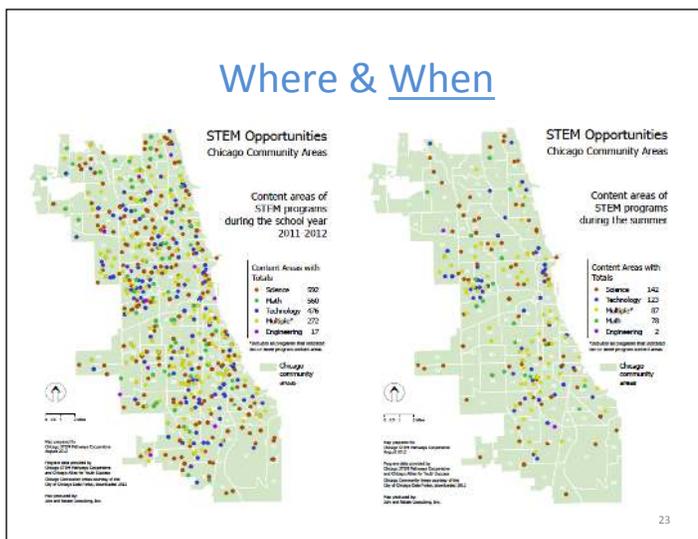
The morning began with introductions Natasha Walker, Executive Director of Project Exploration, Gabrielle Lyon, Director of National Partnerships for 30 Million Words and Founder and Board Member for Project Exploration, Lauren Krieg, Program Officer for the Albert Pick Jr. Fund, and Christy Uchida, Senior Program Officer at The Brinson Foundation. Subsequently, Tony Streit, Senior Project Director at the Education Development Center, Inc. led the morning's efforts.

### Chicago's Expanded Learning Networks: Chicago STEM Pathways Cooperative

Following Introductions, Gabrielle Lyon and Andrew Rice of Bolster Mission Consulting presented the Chicago STEM Pathways Cooperative. Dr. Lyon and Mr. Rice discussed the history of the Pathways Cooperative project, and presented compelling arguments for the need for coordinated STEM Pathways in Chicago, which are defined as the collection of

STEM experiences a young person has between Kindergarten and 12th grade. The groundbreaking research that the Pathways Cooperative conducted and presented in 2011-2012 was described, including methodology and major findings. These findings included a striking underrepresentation of Latino students in Chicago's STEM OST space, a dearth of engineering programs, and a much smaller proportion of programs offered in the summer months. Additionally, the Cooperative's research suggested that program providers are highly engaged but not coordinated, data

are hard to access and sometimes do not exist, and networks of like-minded agencies already exist, which could be leveraged for improved coordination. The vision that culminated from the Pathways Cooperative first phase of work centers around Chicago as an ecosystem of STEM opportunities accessed easily by a self-guided student or a guided experience supported by a counselor or adult, and Dr. Lyon posed the questions that may guide the development of this vision to execution, including:



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- How should we organize ourselves?
  - What skills matter for young people to develop across their STEM program experiences?
  - What will the mechanisms be for involving underrepresented and disenfranchised students?
  - What measures matter?
  - How do we ensure that programs are high quality and accessible?

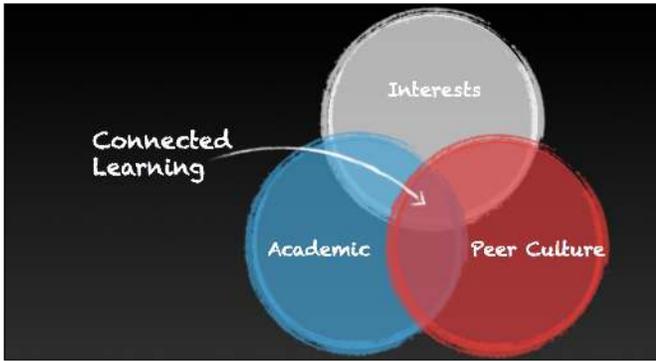
Finally, Dr. Lyon presented the Cooperative Pathways team's recommendations, including:

- The creation of a citywide STEM OST clearinghouse and a coordinator to create a public portal for young people, parents, educators and youth-advocates
- Better coordination between OST providers, Chicago Public Schools and families
- A concerted focus on the most vulnerable students, and strategically engage the most economically disadvantaged parents and families
- Creation of multi-lingual programs to reduce barriers to entry
- Implementation of reduced-fare public transportation on weekends to reduce barriers to entry for high school students
- Increased free and low-cost programs in public venues to reduce barriers to entry
- Prioritized funding that enables organizations to coordinate services and learning among youth organizations
- Establishment of a common language for describing goals and outcomes to facilitate collection of longitudinal data, program management and analysis of meaningful youth participation
- Use of data about the current landscape to set priorities within organizations and across existing networks
- Provision of enhanced professional development

The presentation concluded with Dr. Lyon sharing the details about the Chicago STEM Pathways Cooperative [blog](#), [LinkedIn group](#), and [Twitter feed](#) to support continued engagement and momentum around this important work.

### **Chicago's Expanded Learning Networks: HIVE and Thrive**

The second presentation of the meeting was given by Sam Dyson, the Director of the HIVE Chicago learning network. HIVE is a network funded by the MacArthur Foundation under the stewardship of the Mozilla Foundation. HIVE consists of 57 member organizations including museums, non-profit organizations, and community-based organizations, all youth-serving and dedicated to furthering connected learning. Connected learning is the space of action and learning at which students' interests, peer culture and academics intersect, and HIVE member organizations share a common dedication to the shared goals of equitable access to connected learning opportunities, innovation, value, and the construction



and utilization of learning pathways. HIVE member organizations serve youth via pop-up maker spaces and other programs, OST mentors, and vehicles for and digital amplification of youth voice. Furthermore, HIVE connects practitioners to share best practices, collaborate, engage in practice-based research, and apply for funding opportunities through HIVE grants.

In addition to his discussion of HIVE, Mr. Dyson discussed THRIVE, a city-based initiative to support learning, engagement and success from cradle to career. THRIVE focuses on collective impact and continuous improvement, rather than coordinated action. The meaning of collective impact vs. coordinated action is outlined in the table below:

Collective Impact	Coordinated Action
Group works towards same outcome	Group works on same issues
Group uses disaggregated student-level data	Group shares program information and/or design
Group seeks to continuously improve practices over time	Group seeks to align efforts around a specific issue or population

By working under a model of collective impact, THRIVE supports a model in which group efforts are outcome driven, rather than issue driven to support truly coordinated efforts that produce results. In order to create timely, meaningful impacts on Chicago's youth, the THRIVE model specifies specific, age-appropriate outcomes for each stage of a child's life, from cradle to career, as well as the indicators needed to measure outcome

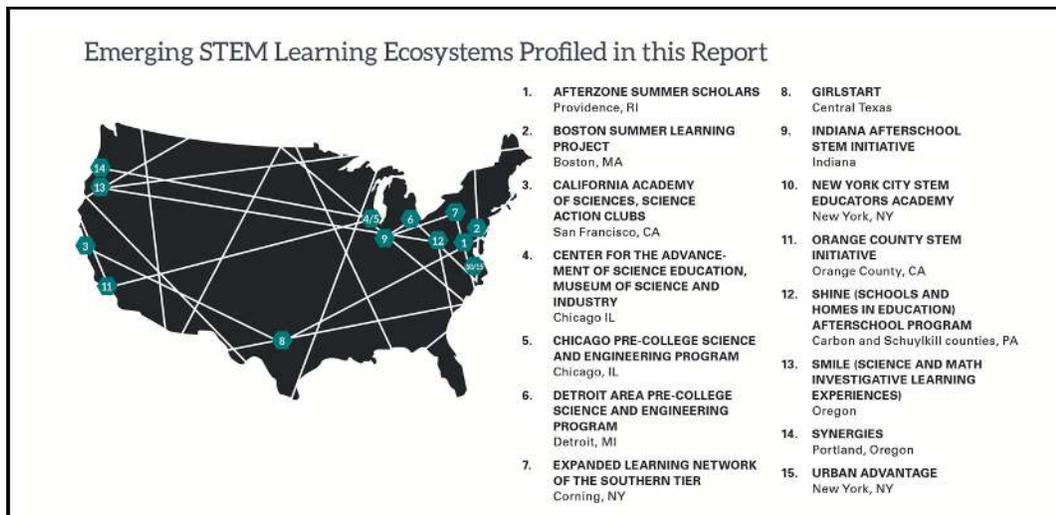
...across the cradle to career continuum										
<b>Vision</b>	Chicago is a city where all succeed in education, career and life.									
<b>Mission</b>	To prepare all of Chicago for a vibrant future for aligning efforts and outcomes from cradle to career.									
<b>Mile-Stones</b>	Enter Kindergarten prepared to succeed.		Advance in school and succeed in learning.			Graduate from high school—college and career ready.		Enter self-sustaining careers.		
<b>Outcomes</b>	Enter K Ready based on KIDS Assessment	Enter K without chronic health issues	Proficient in 3 <sup>rd</sup> Grade Reading and Math	Engaged in Enrichment and Academic Activities	Freshmen On Track	High School Graduation	College and Career Readiness	College Completion	Completion of credentials of economic value	Employment at living wages
<b>Contributing Indicators</b>	-Prenatal care -Birth weight -Enrolled in Medicaid with high quality medical home -Enrolled in high-quality 0-3 programs -Enrolled in high-quality pre-k programs	-K-ready -% of K-3 attendance above 95%	-Adult figure attachment other than parent	-On-time promotion in 3-4 -6 <sup>th</sup> grade attendance -8 <sup>th</sup> ready for HS -Overage for ninth grade	-Freshmen on track -Attendance -Connection to caring adult -Arrests, suspensions and expulsions	-HS GPA -Dual credit and dual enrollment -Make concrete plans for the future -Participate in jobs and internships	-Retention after first year, junior year -Financial aid	-No/limited remedial courses	-Opportunity youth -Unemployment rate -Under-employment rate -% of 18-24yo w/ felony convictions	
<b>Contextual Indicators</b>	-Achievement Gap -Out-of-School Safety -Poverty Rate		-Crime/Violence Rate -ACES -Risky health behaviors			-Teen birth rate -Undocumented learners -Reduction in racial and economic disparities -Livable jobs index				

achievement at each stage. In so doing, THRIVE supports a model of collective impact and action that is measurable, allowing continuous real-time improvement to support Chicago's youth.

## Afterschool Programs: The National Landscape

After hearing about Chicago's STEM OST networks, we learned more about the national STEM OST landscape from Anita Krishnamurthi, Vice President of STEM Policy at the Afterschool Alliance. Ms. Krishnamurthi discussed existing networks and the ingredients

that are needed to make collective impact in STEM OST work. The presentation focused on the report, "Defining Youth Outcomes for STEM Learning in Afterschool," published by



the Afterschool Alliance with support from the Noyce Foundation and the S.D. Bechtel Foundation. Ms. Krishnamurthi delved into state-wide STEM OST networks (as opposed to city-wide networks). These networks got their start in 2002 with support from the C.S. Mott Foundation, and leverage public-private partnerships to build bridges between leaders of schools, communities and families to support student learning. At the present time, there are 42 networks, and they continue to grow, as Alabama and Alaska joined those states engaging in state-wide STEM OST networks. The presence of these networks has allowed an expansion of STEM in OST, and deepened the conversation about the role of STEM in OST. A study conducted by the Afterschool Alliance asked STEM OST practitioners and other stakeholders what outcomes and indicators they felt STEM OST could best deliver, keeping in mind the need to identify STEM OST as a support and complement to in school experiences, rather than an increase in the number of them. Three main outcomes that represent the major developmental impacts on young people were identified. STEM OST can:

- Develop interest in STEM and STEM learning activities
- Develop capacities to productively engage in STEM learning activities
- Come to value the goal of STEM and STEM learning activities

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To demonstrate progress toward the intended program outcomes, STEM OST programs may be best positioned to support and expand young people's:

- Active participation in STEM learning opportunities
- Curiosity about STEM topics, concepts or practices
- Ability to selectively engage in STEM processes
- Awareness of STEM professions
- Ability to exercise STEM-relevant life and career skills
- Understanding the value of STEM in society

Ms. Krishnamurthi continued, sharing sub-indicators for the above defined indicators that are more immediately measurable in the short term. A first set of sub-indicators stresses the *doing* of science, including:

- Active engagement and focus in STEM learning activities
- Ability to work in teams to conduct STEM investigations
- Active inquiries into STEM topics, concepts or practices
- Understanding of the variety of STEM careers related to different fields of study
- Understanding the relevance of STEM to everyday life, including personal life
- Demonstration of STEM skills
- Applied problem-solving abilities to conduct STEM investigations
- Awareness of opportunities to contribute to society through STEM

A second set of sub-indicators for the above defined indicators stresses specific types of knowledge, linked to specific resources or expertise. They include:

- Understanding of STEM methods of investigation
- Knowledge of how to pursue STEM careers
- Mastery of technologies and tools that can assist in STEM investigations
- Knowledge of important civic, global, and local problems that can be addressed by STEM
- Pursuit of in-school STEM learning opportunities
- Awareness that STEM is accessible to all
- Active information seeking about mechanical or natural phenomena or objects
- Demonstration of STEM knowledge

Finally, Ms. Krishnamurthi cited a variety of actions that would support the growth, awareness and impact of STEM in OST. These include:

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## Practice

- Get ready to scale by learning more about what works and what does not
- Create a community of practice for STEM learning ecosystems
- Examine how STEM learning ecosystems can help realize the goals of Common Core mathematics, Next Generation Science Standards (NGSS), and the Framework for K-12 Science Education

## Research and Evaluation

- Learn how to assess learning outcomes across settings
- Disseminate relevant research more broadly and across sectors
- Increase opportunities to connect research and practice across sectors

## Policy

- Craft a policy agenda that identifies strategic levels to advance ecosystem building efforts
- Take better advantage of the flexibility embedded in existing policies

While STEM ecosystems are not new, Ms. Krishnamurthi closed by emphasizing that strong leadership, the removal of policy barriers and advocacy by the STEM OST community are needed for forward momentum, and to ensure the the STEM OST community has a voice in the conversation.

## The STEM Funders Network: An Overview

Inclement weather precluded the final speaker of the morning, Jan Morrison, CEO of the Teaching Institute for Excellence in STEM, from attending the proceedings. However, Matthew Blakely, Director of the Motorola Solutions Foundation and Chair of the Board for Project Exploration, was in attendance to share the details of the STEM Funders Network. The STEM Funders Network is a coalition of funders who share an interest in STEM education, including K-20, formal, OST, and informal STEM education, and operates with the purpose of deepening the knowledge base and field of STEM funders. As a result of the network, participating funders catalyze action that requires a mix of funders who collectively comprise a body of knowledge that matches the needs of the work. While not all members participate in every project, their connection via the STEM Funders Network allows funders to quickly engage when they choose to do so.

Relying on both online and offline mechanisms, the network hosts periodic meetings during which members bring ideas for the group's consideration. Currently, projects seek to activate state-wide readiness of teachers in the adoption of the Next Generation Science Standards (NGSS), broaden access and awareness of high-quality OST programs, and help align in-school, OST, and informal education worlds for learners. Of importance to the day's

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proceedings, the network collaborated on the development and implementation of STEM Learning Ecosystems. These ecosystems include the home, school, OST programs and informal learning environments that can shape and support youth interest in STEM.

Successful ecosystems are:

- Anchored by strong leaders and a collaborative vision and practice
- Are attentive to the enlightened self-interest of all partners
- Are opportunistic and nimble

Common best practices for successful ecosystems include:

- Building the capacity of educators in all sectors
- Equipping educators from different settings with tools and structures to enable sustained planning and collaboration
- Linking in- and out-of-school STEM learning day by day
- Creating learning progressions for young people that connect and deepen STEM experiences over time
- Focusing curricula and instruction on inquiry, project-based learning and real-world connections to increase relevance for young people
- Engaging families and communities in understanding and supporting children's STEM success

The network continues to support ecosystem cultivation by:

- Stimulating a community of practice
- Highlighting the value of informal science providers to meet goals of Common Core mathematics, NGSS and the Framework for K-12 Science Education
- Inform the STEM research agenda
- Encourage creative thinking in STEM policy

### **Funder Discussion: Ideas to Action**

The morning concluded with a discussion among representatives of various Foundations and other funding agencies, centered around three central questions:

1. What could more coordinated efforts toward a STEM OST strategy accomplish?
2. What would that coordinated effort look like?
3. What are the challenges that may arise in creating a city-wide STEM strategy?

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## Coordinated efforts:

Those in attendance appreciated the STEM Funders Network model, as such a model could help funders understand the impact their investments have. While meaningful experiences might have the most profound impact of student interest and engagement in STEM, they may not move test scores, so consensus on the most important outcomes and indicators could be supported by such a network.

**Challenges:** Various challenges were identified during the course of the conversation:



- City-level funding needs to be more nimble to respond to community in real time
  - Creativity may not be encouraged in all school settings, so the value of cradle to career efforts may not be consistently realized
  - Changing the focus from regurgitation of information to integration of practice, contextualization and concepts
  - Making the connection between experience in OST and school settings can be challenging
  - Appropriate tracking for outcomes and program structures can be tricky
  - There isn't central knowledge or information about funders' interests and practices, so coordination can be challenging
  - Awareness of which funder or entity would serve as central organizer for such an effort may be a barrier
- Assessing affective learning outcomes, including confidence, sense of community, self-efficacy, belonging, rich relationships, transformative experiences, and the like may pose a challenge
  - Scaling successful programs can be challenging
  - Numbers are not everything - building capacity can be a challenge for programs (and their funders) that are doing difficult work and making an important difference in the lives of youth, but may not have high enrollments
  - Avoiding barriers introduced by policy and existing structures in funder community may present challenges

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**Opportunities:** Various opportunities were identified during the course of the conversation:

- A model like the STEM Funder Network can help funders fill in knowledge gaps - for example, if research is not one funder’s area of focus but another funder does focus on research practices, they can collaborate to inform each other and utilize knowledge to support better giving practices
- Coordination could support the alignment of measurement and assessment language and strategies
- Leveraging existing systems for collaboration (e.g., CPS parent portal) could simplify the effort
- Integration of STEM strategy in OST comprehensively
- Utilize mapping to inform funding collaboratives
- Collaboration would help funders discover from peers what worked, what didn’t work, and how learnings will change what funders do moving forward regarding STEM, education and college and career readiness
- Increased collaboration and sharing can fuel quality and improvement systematically in STEM programs
- Coordination presents the opportunity to develop common language and metrics around quality
- Collaboration fosters increased focus on family engagement
- The forward momentum of a systematic approach supports programs in pushing their assets into the community to view themselves and be viewed as part of the city beyond their own walls

## Action Steps

Culminating the day’s proceedings, three major action items emerged from the day’s discussion:

**Action Step 1:** Learn about the Chicago Office of the Mayor’s citywide STEM strategy

Next Step	Leaders
Plan follow-up meeting for attendees, including presentation by Office of the Mayor regarding citywide STEM strategy, to help attendees how the city’s plan aligns with existing networks’ efforts and research.	Chicago STEM Pathways Cooperative Leadership

**Action Step 2:** Strategy map what and where Foundations and other funding sources in Chicago are supporting programs

Next Step	Leaders
<p>Use existing data to map STEM programs supported by local foundations and other funding sources, in order to help the funding community begin analyzing intersections of interest and action with peers, patterns in funding, gaps in funding, and other variables, utilizing three fundamental questions to guide the process:</p> <ul style="list-style-type: none"> <li>• What are you funding?</li> <li>• What are your strategic priorities, what would you like to accomplish?</li> <li>• What are you learning from your experience, what can you teach your peers?</li> </ul>	<p>Tony Streit, Senior Project Director at Education Development Center, Inc., has generously agreed to begin this ongoing process, although additional people and resources will be required to move this work forward</p>

**Action Step 3:** Follow up on the recommendations of the Chicago STEM Pathways Cooperative report, “State of STEM in Chicago in Out-of-School Time”

Next Step	Leaders
<p>Host a follow-up meeting to enable attendees, particularly funders, to thoughtfully examine the recommendations of the Chicago STEM Pathways Cooperative report, and define next steps for the funding community to support these recommendations</p>	<p>Chicago STEM Pathways Cooperative leadership will be scheduling this meeting in the coming few months</p>

These action steps will support the momentum and planning for this important work, helping all to learn from each other with research-based practices. The Chicago STEM Pathways Cooperative will serve as a primary communicator and will keep attendees informed of the progress and next steps.

*The Chicago STEM Pathways Cooperative wishes to thank the Albert Pick Jr. Fund and The Brinson Foundation for their support of this convening. In supporting this discussion of systematic approaches to STEM in OST, they are making an important contribution to the learning and success of youth in Chicago.*