I like to think of men and women as artists of their own lives, working with what comes to hand through accident or talent to compose and re-compose a pattern in time that expresses who they are and what they believe in—making meaning even as they are studying and working and raising children, creating and re-creating themselves...lives are composed somewhat like works of art, partly planned and partly improvised...

Like the faces of wise and loving elders, lives so composed may be beautiful.

Mary Catherine Bateson
Composing a Further Life: The Age of Active Wisdom

Composing a Children’s Museum Field: Research Agendas and More
Al DeSena, PhD
National Science Foundation

In science and in everyday life, time is relative. The ten years that have elapsed since the two 2004/2005 issues of Hand to Hand about the potential benefits and implementation of a children’s museum research agenda may seem long or short depending on how one thinks about the scope of the task and on one’s frame of reference. Ten years, one tenth of a century, one hundredth of a millennium…What degree of progress is reasonable to expect? How do we apply the carefully considered and vetted 2015 research agenda now to make a difference in the lives of children, their families, and communities? Are we taking the long view for the long haul? How long do we as institutions and as a field expect to exist, change form in minor or major ways, make a difference?

While re-reading “Establishing a Research Agenda for the Children’s Museum Field,” my lead article to the winter 2004 issue of Hand to Hand, I was struck with how many of the messages I tried to convey then still resonate with me. In particular, I still am an advocate of thinking and working systemically and systematically to develop a research framework that contributes to a stronger knowledge base but one that is also integrated deliberately with our collective creativity and wisdom. I also quoted Mary Catherine Bateson throughout the piece, feeling compelled, with her thoughts as a guide, to help mold a more inclusive context that shapes and contains a research agenda in ways that are practical, realistic, and that matter dearly to us. Some of you may recall that she also gave a very well received key-
note presentation at the 2005 InterActivity conference, which is documented in the summer 2005 issue of Hand to Hand—and very much worth revisiting.

And, thus, I applaud the Association of Children’s Museums (ACM), the Institute of Museum and Library Services (IMLS), consultants, and everyone involved in the field for their considerable, thought-ful, and systematic efforts reflected in today’s “final product,” knowing that the research agenda document and the Phase 2 steps are still but milestones along a path that will continue to germinate, enlighten, and morph over time. Also, as you can see from the introductory quote from Mary Catherine Bateson’s work, I am again drawing here upon the ever-flowing stream of inspiring ideas presented in Composing a Further Life as well as in her many other books.

In addition to the voluminous literature in sociology, social psychology, organization studies, etc. on the development of organizations, professions, and fields like children’s museums, one could derive meaningful insights into where we find ourselves today and where we may be heading by expanding Bateson’s metaphor about “composing a life” to encompass our full range of interests—to the children, families, and communities we serve, to our staff and collaborators in organizations around the globe dedicated to improving lives, and, indeed, to our association, profession, and field.

I am certain that from Composing a Further Life you could derive many more applications beyond her original intent than what I have space to emphasize here, where I have selected six ideas that I find to be especially salient.

### Composing a Children’s Museum Field

I would propose that one could easily exchange Bateson’s “men and women” with a full set of stakeholders who are part of the system within which we think and act: visitors, staff, museums as organizations, networks of organizations, communities served, and professional associations. All are engaged in the lively interplay of pattern-making, meaning-making, studying, planning, and improving, and, I would suggest, are guided by either explicit or implicit aesthetic criteria—creating beauty. Even research and research agendas should aspire to be beautiful—there are the scientific foundations, but there is also the art of it all.

Another consideration about composing a field is the systems question of the scope of the research agenda, what is manageable, how to prioritize, and especially, how to connect that work with other forms of knowledge-building. In his recent article, “Measuring Museum Impact and Performance,” museum planner John Jacobsen provides a useful perspective on this need where he suggests that we develop a theory of action that is attentive to public values of society as a whole; private values of businesses; personal values of individuals, families, and households; and our own institutional values. For each of these entities he then provides examples of key benefits. For example, for public values, benefits include broadening participation, preserving heritage, strengthening social capital, enhancing public knowledge, serving education, advancing social change, and communicating public identity and image.

### Interdependence

Bateson makes a very strong case that American society is hyper-individualistic, when in fact human life—indeed, all of life and earth’s systems—are interdependent. “The reality of all life is interdependence. Every form of knowledge—social, cultural, scientific, etc.—is manageable, how to connect that work with other forms of knowledge-building. In his recent article, “Measuring Museum Impact and Performance,” museum planner John Jacobsen provides a useful perspective on this need where he suggests that we develop a theory of action that is attentive to public values of society as a whole; private values of businesses; personal values of individuals, families, and households; and our own institutional values. For each of these entities he then provides examples of key benefits. For example, for public values, benefits include broadening participation, preserving heritage, strengthening social capital, enhancing public knowledge, serving education, advancing social change, and communicating public identity and image.

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The Association of Children's Museums is pleased to circulate the Learning Value of Children's Museums Research Agenda. While this document is called a research agenda, if you prefer to think of it as roadmap or a framework for research, please do so. What it’s called is of less importance than what it represents: the summary of a field-wide process to identify and prioritize what needs to be known about children's museums, the learning that takes place in them, and the impact they have on the lives of the children, families, and communities they serve. This research agenda also represents a pivotal milestone in the children's museum field as it marks the starting point for developing a collective, evidence-based body of knowledge that can be used across institutions to improve practice, build theories of learning, and demonstrate the unique value of children's museums.

—Introduction, Learning Value of Children's Museums Research Agenda

Children's museums contribute to the lives of children, families, and communities in significant and meaningful ways. In a recent public opinion poll, 95 percent of parents strongly agreed/agreed that children’s museums are valuable learning institutions. In the past four years, 30 percent of museums awarded the National Service Award—the highest U.S. honor conferred on museums and libraries that make a difference for individuals, families, and communities—were children’s museums. While there is research ongoing to document the impacts of children’s museum, much remains unknown about how learning is supported and facilitated in these institutions.

Funded by the Institute of Museum and Library Services, the Association of Children’s Museums (ACM) and the University of Washington’s Museology Graduate Program (UW) undertook the Learning Value of Children’s Museum Research Agenda Project in December 2012. The project goal: to generate a field-wide research agenda for children’s museums that identifies and prioritizes the evidence most needed by the field to articulate and demonstrate the distinct learning impacts of children’s museums. The full research agenda can be downloaded from ACM’s website. This article provides an overview of the process used to build the agenda, and highlights some significant areas of research identified within it.

Building the Research Agenda

On September 10–11, 2013, more than 110 museum staff, academic and independent researchers and evaluators, and policymakers worked collaboratively to identify the most pressing research questions that needed to be answered in the children’s museum field. Inspired by calls to action from several prominent researchers, participants engaged first in small group discussions to generate questions, and then in large group discussions to clarify and prioritize the questions. A list of nine sets of questions emerged to guide research and evaluation studies. After the symposium, ACM invited the field to participate in one of four webinars that provided an overview of the project and its key activities, a synopsis of the symposium process and proceedings, and a discussion of the categories for research. Following the webinars, the project team took the nine sets of questions and organized them into three themes. Below, we share highlights from each theme and its questions.

Research Agenda Themes

A

Characteristics of Children's Museums

These questions investigate the unique and long-term impacts of children’s museums, the learning environment itself, and institutional culture—from beliefs about learning to the role of research in helping children’s museums evolve and innovate. Research in these areas can be used to strengthen the mission of children’s museums, identify best practices by demonstrating how specific elements in the children’s museum environment support acquisition of specific skills, and gain increased support from funders and other stakeholders.

The Value and Impacts of Children’s Museums

• How are children’s museum impacts distinct from other influences on children?
• What are the long-term benefits/impacts of children’s museum visits on children/families?

B

Audience

Audience-focused research questions can tease apart the process of learning in children’s museums. This information can be used to improve practice to further expand museum learning, to strengthen the learning ecosystem, and to elevate the stature of children’s museums. This research may lead to the development of a shared language to talk about learning in children’s museums as well as the discovery of new types of learning.

• What do community members (e.g., parents, teachers, children, stakeholders) perceive the benefit/value of children’s museums to be?

Learning Environments and Strategies

• What children’s museum activities promote creativity and problem-solving, cognitive processes, executive function, etc.? And why is any of this important?
• What factors (parent-child interactions, design, staff interactions) influence learning (critical thinking, creativity, innovation) in children’s museums?
• What is a “high-quality” children’s museum experience, and how do we measure it?

Children’s Museums as Learners

• How do beliefs about learning (from project participants, museum staff, parents, teachers, board members, stakeholders, and funders) impact how children’s museums support children’s learning and how we understand the role of children’s museums?
• What is the role of research in a children’s museum? How can it help children’s museums to adapt, evolve, innovate?
• How do we grow a culture of research in our museums, in our partnerships, and in our communities?

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The Evolving Role of Research in Museums
An Interview with George Hein, PhD, Lesley University

N oted writer, researcher, and museum education theorist George Hein began his professional life as a chemist. His subsequent immersion in the social activism of anti-war movement of the ’60s led him to question his involvement with biochemical research. At the same time, following his own children’s progress through a suburban Boston-area school system, he became more interested in improving education, specifically science education, and applied his academic training to new work on the Elementary Science Study Project at the Educational Development Center (EDC) in Newtown, Massachusetts. EDC’s original goal of improving science education in the United States contributed to a revolution in science teaching, evolving away from rigid, skills-based curricula to hands-on, materials-rich and theme-based units offering students open-ended exploration.

Joining the Lesley University faculty in 1975, Hein founded its first PhD program in educational studies. With colleague Brenda Engel, Hein cofounded the Program Evaluation and Research Group in 1976 to evaluate the educational work of twenty-five Boston area museums and arts organizations. Since that time, Hein has been a leader in museum education and evaluation, specializing in qualitative in-depth program evaluation and visitor research.

From 2006 to 2007, Hein was president of Technical Education Research Centers, a Cambridge, Massachusetts-based nonprofit educational research and development organization focused on innovation in STEM learning. Over the years, Hein has been a Visiting Scholar at The J. Paul Getty Museum; Visiting Faculty, Fu-Jen University (Taipei); Visiting Faculty in Museum Studies at University of Technology, Sydney (Australia); Howard Hughes Medical Institute Visiting Scholar, California Institute of Technology; Visiting Faculty Museum Studies Program, Leicester University; Fulbright Research Fellow, King’s College, London; and a Research Associate, Museum of Science (Boston.)

In addition, Hein is the author of numerous books and articles, including Learning in the Museum (1998), and, with co-author Mary Alexander, Museums: Places of Learning (1998). In his most recent book, Progressive Museum Practice: John Dewey and Democracy (2012), Hein explores the work of philosopher and educational reformer John Dewey and its relevance for museums. Through the lens of Progressivism and its focus on improving people’s lives through socio-political and educational reform, Hein discusses the long history and current state of progressive education in museums.

Hein is currently Professor Emeritus in the Graduate School of Arts and Social Sciences at Lesley University in Cambridge, Massachusetts, and Senior Research Associate at the Program Evaluation and Research Group at Endicott College, Beverly, Massachusetts.

What do we mean by “using research” in the museum?

The term “research” has been part of museum activity as long as there have been museums. Traditionally, research was carried out by curators to find out something about the museum’s collection—for example, the provenance of a painting, the background information for developing an exhibition, or the historical validity of an interpretation. But applying the term to studying visitors in a systematic way is a relatively recent phenomenon, roughly 120 years old.

With the advent of public museums, which dates back to the 18th century, museum professionals have been curious about who their visitors were, what they did in museums, and what the consequences of those visits were for them. Even though there were no children’s museums before the Brooklyn Children’s Museum opened in 1899, children visited museums, so speculation about what they might learn and whether the museums were appropriate for them goes back farther. For example, George Brown Goode, a champion of museums as educational institutions, wrote in 1888, “I would not organize the museums primarily for the use of people in their larval or school-going stage of existence.” In contrast, H. H. Hig- gins, who published the first visitor study in 1884, argued that even casual visitors including “Little parties of children [who] sometimes found the table-cases convenient for racing around” should be taken seriously since they and their parents, mainly casual visitors, “had brought themselves for the time into contact with sources of improvement,” and that their large numbers “made them after all, the most interesting class of visitors.”

Is there a more compelling need for research now than in previous years, and if so, how does this change affect the direction of research in the field?

The need for visitor research is as old as the recognition that museums had a public educational function, but the recognition that visitor research is important derived originally from the awareness, sometime in the late 19th century, that social science as a discipline might be of use to society.

The systematic study of nature as primarily an experimental effort, rather than mainly an intellectual one, is associated with shifts in thinking in the 16th and 17th centuries; we think of “modern” science and modern scientific methods as activities that evolved over the past 400 years or so. The application of these general ways of thinking to social issues—human development, so-
of individual children or groups of children over semesters or even several years. But, museum visitors on the whole are ephemeral, and it takes considerable effort just to identify and know enough about their background and social situations to study them over a reasonable time as individuals. Museum visits are both short and infrequent.

There are a few studies that have attempted to follow museum visitors over long periods of time (interviews a year after a museum visit, for example) but nothing has been done with the consistency and breadth of scope to match, for example, epidemiological public health research (the Harvard Nurses Health Study has followed hundreds of thousands of nurses since the original cohort in 1976) or the classic child development studies that followed children over months and years. Most relevant to children’s museums may be the High-Scope Perry Preschool Study that followed children for many years during and after their Head Start experience and demonstrated that their early education exposure not only increased their IQ scores, but also improved their lives as adults in measurable ways.

In 1956, a London study of children visiting the Children’s Gallery at the (London) Science Museum reported that most children spent very little time at individual exhibits and “tend to flit from one thing to another, stopping to press buttons or turn handles, treating the Gallery more as an amusement arcade than as a source of scientific information.” But among the same children there were some “habitues” who had come multiple times and who went to “considerable trouble and expense” to come to the museum, even from “more distant parts of London by means of buses, tubes or both.” I wish the researchers had followed these children over time.

**What methods and/or questions yield the richest and most actionable information?**

We need longitudinal studies (over many years) of children who spend considerable time in museums. We also need more studies that take into account the cultural and social context of children’s experiences in museums.

The goals of evaluation and research in any field may be different, but the methods used are the same. They both apply a set of research tools (observations, interviews, asking people to perform a specific action or analyzing the products of human activity). Evaluation, by definition, is the study of what a specific activity or program has (or has not) accomplished. Research is an effort to understand something about the world. In order to carry out experimental research (as distinct from theoretical research or library research) the researcher(s) will most likely develop or follow some activity that happens in the real world. They may choose to study naturally occurring practices or specifically devise a situation to provide evidence relevant to the researcher’s questions. For example, in his pioneering behaviorist research in the 1930s, Arthur Melton studied the effect of varying the number of paintings on the wall of a museum gallery on the time visitors spent in the gallery. He was not evaluating visitor response to a particular exhibition, but trying to gain experientially based information on the effect of the number of paintings (they are not even identified in the research report) on visitor time in the gallery.

The term “evaluation” traditionally refers to the examination of a program or exhibition that has been initiated for some reason other than to expand general knowledge about how people behave and learn. The goal of a program may be to achieve some educational outcome, increase visitation, or continue the museum’s service agenda. Evaluation then asks the research question, did the activity do what it intended and what other consequences were there? The purpose is to inform the activity’s sponsors of a program’s intended and unintended outcomes and to provide information to a program’s creators about how to improve future actions. An exhibition, for example, is not conceived to further our knowledge away from strictly behaviorist research that measured only time spent overall and at specific exhibits and simple pre/post interviews or questionnaires (popular in the 1920s and 1930s) to more detailed analyses of children’s experiences with references to the social and cultural issues that influence museum experiences.

**Are research and evaluation fundamentally different? If so, are they different enough to be viewed as separate functions or applied differently by museums?**

Based on your long experience in the field, can you think of any earlier, perhaps overlooked avenues of research pertinent to children’s museums that should be revisited?

A major obstacle to researching children’s development and learning in museums as opposed to other settings is the difficulty of finding a stable group of subjects to study over a reasonable period of time. Learning and development take time. Children’s mental and physical development have been studied extensively by observing and interacting with the children over long periods; learning (or any behavior) in schools has been studied by documenting the activities
Contributing to What We Know about Museum Visitors: Participating in the Visitor Studies Continuum

Susan Foutz and Claire Thoma
The Children’s Museum of Indianapolis

If you visit The Children’s Museum of Indianapolis during the summer months, your curiosity might draw you to a temporary gallery with the inviting name Try It Out! At its entrance, a staff member greets you and explains that your family is welcome to participate in the activity inside and provide feedback. Intrigued by the array of collections objects laid out on the tables and by the idea that the museum’s staff wants to learn from you and your children, your family enters the space and is greeted by another staff member. This person introduces herself as one of the museum’s curators and guides your family through an activity in which you read creative object labels and rate the perceived importance of five objects. After spending about ten minutes completing the activity and answering some of the curator’s follow-up questions, your family is ready to go visit the dinosaurs, and you leave the space feeling excited that you got a glimpse behind the scenes of the museum. You probably would never realize that you had just experienced one piece of the continuum of visitor studies that exists at The Children’s Museum of Indianapolis.

Many museums, children’s museum included, use visitor studies to learn more about their audiences and to expand the front-end studies or formative evaluations.

Institutional knowledge of what works (and what doesn’t). The resulting reports contribute to a long-term record of evaluation findings, but the evaluation results are most powerful when shared with project teams and integrated into how they approach their work. Helping other staff members to apply evaluation study findings and growing the evaluation capacity of non-evaluators on staff are some of the primary tasks of the research and evaluation department. While the museum’s size and resources may allow for a great volume of evaluation work to take place, the range and nature of visitor studies that are conducted fall along a continuum. Many of the study types on this continuum are feasible for small and medium-sized museums as well.

The field of visitor studies is often identified with evaluation but more accurately it is a continuum of “quick and dirty” evaluation at one end to basic research at the other. Research is the systematic study of a topic with the goal of producing new knowledge. Basic research can be thought of as building a field’s theories but not necessarily applying the knowledge in real-world situations. Evaluation is a type of applied research—taking the results from a systematic study and putting them to work to solve practical problems. Museum staff members who are not professional evaluators conduct much of the evaluation along the visitor studies continuum; this is true at The Children’s Museum of Indianapolis even though there are now two professional, full-time evaluators on staff. By walking through the types of evaluation on the visitor studies continuum, staff at even small museums may realize that they are participating in this field-wide movement.

One end of the visitor studies continuum is anchored by the quick-turn around, improvement-oriented evaluation so many staff members do on a regular basis. At The Children’s Museum of Indianapolis this often takes the form of prototyping, mechanical remediation of gallery elements, or iterative improvements to regularly-delivered programs. This type of evaluation is initiated and led by exhibit developers and program staff. Often called “quick and dirty” evaluation, it uses a small number of interactions with visitors to identify an issue. For example, staff have taken rough prototypes of exhibit elements out on the floor to see if visitors understand how they work or if additional labels are needed. The staff member often draws upon her intuition of what works and her knowledge of best practices to identify the problem and develop solutions. While some may call this type of evaluation “informal,” this degrades its very real value and the intentionality with which it is conducted. Evaluation is nothing more than having a question, collecting data (through observation, conversations, surveys, etc.), finding a pattern in the data, and using that pattern to assess a situation. If a problem is approached with this mind-set of intentionality, then it is evaluation and it does not need to be labeled as “informal” to excuse its rough-and-ready appearance.

FROM EVALUATION TO RESEARCH: THE VISITOR STUDIES CONTINUUM

From “quick and dirty” on-the-floor prototyping to longitudinal, university-affiliated studies, there is a considerable amount of overlap among the types of research conducted in museums. But there is value to all well-designed, well-managed evaluation and research. Much of what we know about our visitors and what works in informal learning settings is documented through evaluation as well as research. Non-evaluators and evaluators alike can participate in growing our understanding by conducting evaluation and research along the visitor studies continuum.

TIME + COMPLEXITY

Small front-end studies or formative evaluations

Large-scale, long-term research projects and community impact studies

Medium-sized front end studies and summative evaluations

EXPERIENCED STAFF CAPABILITIES

Non-evaluator staff, some experience

Professional evaluators/researchers (in-house staff or outside consultants)

FROM QUICK & DIRTY TO LONG-TERM RESEARCH: THE VISITOR STUDIES CONTINUUM

Basic research can be thought of as building a field’s theories but not necessarily applying the knowledge in real-world situations. Evaluation is a type of applied research—taking the results from a systematic study and putting them to work to solve practical problems. Museum staff members who are not professional evaluators conduct much of the evaluation along the visitor studies continuum; this is true at The Children’s Museum of Indianapolis even though there are now two professional, full-time evaluators on staff. By walking through the types of evaluation on the visitor studies continuum, staff at even small museums may realize that they are participating in this field-wide movement.

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Moving along the continuum, another form of evaluation are relatively small studies that include more visitors than the quick-and-dirty variety and usually use a form or data collection “instrument” to record the data. This can include front-end studies, such as title-testing or gathering families’ thoughts on a particular concept, or formative evaluations. Formative evaluation includes testing elements or programs that are not finalized and still have room for substantial changes. Prototype-testing is one type of formative evaluation. At the museum, these types of studies are also regularly conducted by non-evaluator staff members. The museum’s Try It Out! space is a prime example of this type of evaluation.

In 2014 a formative study conducted in Try It Out! was led by the museum’s marketing team. They wanted to know how to advertise a winter-themed exhibit, Jolly Days. Previous TV spots had used animated characters in an animated winter landscape. Marketing staff wondered if families who had never visited the museum before would prefer the animated commercial or a live-action commercial that showcased the actual exhibit. So they set up two laptops, and asked first-time visitors to watch the animated commercial and a rough commercial made from old footage that showed families playing in the real exhibit. After watching both commercials they asked families which commercial they preferred and why. The results were clear to the team—if your goal is to attract new visitors to Jolly Days, the live-action commercial was more powerful since it showed exactly what there was to do in the exhibit.

An example of a front-end study from Try It Out! involved asking visitors to vote on which potential exhibit they would visit. Visitors were given descriptions on cards of a dozen exhibits and asked to sort them into three piles: would not visit, would visit if we did not have this, would visit if we had this and time that most non-evaluators do not have. The museum typically does only one large-scale exhibit evaluation of this type per year. The data is used in a number of ways: to inform the board and the executive team of the degree to which the exhibit met its goals, as baseline information in case changes to the gallery are made in years to come, and most importantly, to inform the exhibit

continues on page 9
of visitors; it is intended to educate, amuse, increase attendance, mollify a donor, satisfy the whim of a director, or any number of other reasons. But funding agencies want to know what was accomplished due to their investment. The “pure” researchers, as distinct from the evaluators, want to find out how people learn, or what conditions influence their behavior, so their agenda may or may not coincide with the museum’s educational or social agenda.

Evaluation is sometimes considered more objective if conducted by outside professionals. Is this true of research as well?

I believe that it doesn’t matter if research or evaluation is conducted by museum staff or outside consultants. But both categories of study are likely to be more effective, more efficient, and more valid if carried out by people with experience in such work than if these responsibilities are added on to the workload of people who have little training, less time and (perhaps) less incentive—whether these are museum staff or outside consultants. Expertise helps! There are many examples of excellent evaluation and research studies carried out by museum staff or by external consultants. Unfortunately, there are examples of sloppy evaluation and research studies carried out by both categories of evaluators or researchers. Hiring an “independent” consultant rather than having work done by a museum employee is no guarantee that the external researcher or evaluator will be more “objective” than a museum employee. Political and personal qualities enter into any relationship and can influence the performance of the work. For example, an employee may feel pressured to modify data or overlook certain factors, so that a conclusion is less negative, but similar pressures may influence outside consultants who rely on future contracts and good recommendations for their professional survival. In working with external researchers, it’s important for museum staff to be sure that the outsider’s approach to evaluation or his or her research agenda matches the political and educational goals of the museum. In working with staff as evaluators the political and social tone of that particular institution may influence what the staff member takes for granted or fails to notice.

Just because a research finding is published or is hyped in the press does not mean that it is either valid or relevant—and most children’s museum employees are not professional researchers. What are some ways that children’s museum staff can become appropriately critical consumers of research?

There is no simple answer to this question. Just think about the controversies that surround issues involving empirical data on topics such as evolution or climate change. There are quite a few professional researchers and evaluators active in the field of museum studies today. There are abundant professional organizations, discussions, training sessions, and conferences. Most researchers interested in museum studies are willing to discuss professional work with museum staff on either a formal or informal basis. Any publicly discussed research or evaluation report is likely to have some limits to its applicability to a specific situation. But there is also likely to be someone nearby—and everyone in the field is “nearby” today through email, blogs and discussion groups—who would be willing to comment on a topic, especially if it has been “hyped by the press.”

Research questions, especially brain research and more rigorous lab-based psychology research, are often extremely narrowly defined. How can museums identify relevant and useful applications of broader research?

The applicability of brain research findings to practical day-to-day activities of children’s museums is difficult to evaluate, but my sense is that its relevance is minor at best. There was a period when some brain research groups claimed that because there was little brain growth during adolescence this finding made efforts to teach teenagers concepts at that age unlikely to succeed. More recently, brain development researchers are more cautious about applying their anatomical and physiological findings directly to education advice. The ability of humans to adjust to actual situations is influenced by an enormous range of factors. Even with current technology that allows various forms of brain imaging while subjects perform some activity, our knowledge of the correlation between the results of such studies and human capabilities in everyday life is still limited.

How transferable is any research—or even evaluation—when children’s museums often have unique environments? How applicable are the findings of studies not conducted in “real” museum environments?

Again, this is not an easy question to answer—it depends. Piaget studied the development of object permanence in his own children, noting how babies gradually real-

ized that an object out of sight might still exist. (Every parent knows about this developmental stage.) American behaviorist psychologists criticized him, claiming that his were not “ordinary” children and he had a small sample size, only three. But his work is irrefutable and relevant to our knowledge of child development. Doing research in labs or with special equipment does not make the results irrelevant for other settings. Museums have set up their own experimental rooms to test a mock up of an exhibition or to ask visitors to try a hands-on activity. Exhibit developers have found such research useful, even if the experimental situation can only provide partial information about how an exhibit will work when incorporated into the public museum setting. It’s important to ask about the applicability of any research results to different settings, but the answer will vary depending on the particular research and the particular settings that are being compared.

If museums follow John Dewey’s philosophy of Progressive Education, they engage visitors in learning by doing and work toward (roughly paraphrased from Progressive Museum Practice, p. 38) “improving economic and social conditions...and building a stronger democratic society.” As museums work to increase accessibility and promote diversity in its broadest possible definition, what research exists—or could be done—to demonstrate the strengths of this approach?

If museums are serious about accepting the challenge of promoting democracy and social justice, then I believe they should incorporate that responsibility into their research activities. The list of potential research questions provided in the recent Learning Value of Children’s Museums Research Agenda, implies that “improving economic and social conditions and building a stronger democratic society” might be addressed within the agenda, but in my view the proposed research agenda could include more direct questions on this topic. Besides proposing “How do children’s museums help us understand cultural variations?” We might ask, “What can children’s museums do to improve tolerance towards the cultural variations in our society?” Or, based on knowledge of local social issues, museum staff could initiate research or evaluation activities deliberately designed to contribute hard evidence of practices that might ameliorate discriminatory situations.

Some years ago, Jeri Robinson at Boston Children’s Museum added a component to Countdown to Kindergarten, their program...
If museums are serious about accepting the challenge of promoting democracy and social justice, then I believe they should incorporate that responsibility into their research activities. The list of potential research questions provided in the recent Learning Value of Children’s Museums Research Agenda, implies that “improving economic and social conditions and building a stronger democratic society” might be addressed within the agenda, but in my view the proposed research agenda could include more direct questions on this topic. Besides proposing “How do children’s museums help us understand cultural variations?” We might ask, “What can children’s museums do to improve tolerance towards the cultural variations in our society?”

Contributing to What We Know continued from page 7

development team. The evaluation staff work with the team to identify the lessons learned and how they could be applied to future projects. In-depth evaluation studies of programs are usually done for grant-funded projects or a high-profile program, like the museum’s preschool. Similarly the evaluation staff work with the project team to identify questions, then plan and carry out the evaluation with minimal help from the team.

The next level of study may straddle the line between evaluation and research: studies that are designed to measure the impact of the institution and its mission on visiting families and on the community. While staff evaluators at The Children’s Museum conducts these studies, most small and medium-sized museums would likely need outside help. These projects are often large, relatively exploratory, and may not result in immediately applicable findings. Instead, an institution would have to reflect on and absorb the findings, using them to inform long-term planning or institutional change. An example of such a study was the museum’s large-scale visitor study to determine the rate at which families experienced various indicators of family learning during their visit and to explore whether any correlations exist between demographic factors and frequencies of family learning behaviors. The study included the development of a multi-item summative or Likert scale that required multiple phases of pilot testing to create a reliable measure that can be used in future studies.

Finally, the continuum ends with research projects. Even at The Children’s Museum, research projects are not often conducted by internal staff (except for some grant-funded projects). For the museum and many other museums, including research projects in the museum’s visitor studies portfolio means finding outside partners such as local college or university professors or graduate students who need to conduct research for their degree program. In a recent example of this type of partnership at the museum, a former evaluation intern approached the museum about collecting dissertation data in Playscape, the museum’s gallery for children ages five and under. Internal evaluation staff acted as a liaison for the student, assisting her in scheduling data collection, discussing best practices in observing and approaching visitors, and sending an email to museum members on her behalf. While her research may not directly benefit the museum, it will assist the children’s museum field as a whole by providing information on how parents scaffold their pre-school-aged children in hands-on galleries.

As the Association of Children's Museums looks to build a field-wide research agenda, it is important to remember that many institutions with various levels of evaluation capacity can and do participate in growing the field’s body of knowledge. Much of what we know about our visitors and what works in informal learning settings is documented through evaluation as well as research. Non-evaluators and evaluators alike can participate in growing our understanding by conducting evaluation and research along the visitor studies continuum and sharing our results inside and outside our museums.

Cynthia Mark-Hummel, former director of early learning research and education at the DuPage Children’s Museum (Naperville, IL), has more than thirty-five years of experience with exhibit and program development, administration, and construction management in museums including The Field Museum, Cranbrook Institute of Science, the Museum of Science (Boston), and the Adler Planetarium.

Lorrie J. Beaumont, EdD, has over twenty years of experience as an educator and evaluator for museum exhibits and programs. Prior to becoming director of Evergreen Research and Evaluation, LLC, she worked for Selinda Research Associates in Chicago. Beaumont is now director of programs at the Ann Arbor Hands-On Museum (MI).

Nicole Rivera, EdD, is an educational psychologist and faculty member at North Central College in Naperville, IL. Through her Informal Learning Research Team, Rivera and her students work on research and evaluation projects at the DuPage Children’s Museum and other local institutions. She is the current chair of the Chicago Cultural Organizations Research Network.

Susan Foutz is the director of research and evaluation at The Children’s Museum of Indianapolis. She holds a master’s degree in museum studies and began her career as an evaluator in 2003.

Claire Thomas is the evaluation and research coordinator at The Children’s Museum of Indianapolis. She earned her master’s degree in museum studies from Indiana University-Purdue University Indianapolis in 2012 and has been at The Children’s Museum since 2010.
Using Research to Make Learning through Play Visible

Susan Letourneau, PhD, and Robin Meisner, PhD
Providence Children's Museum

1) Learning is experiential, dynamic, and shaped by the physical, social, and cultural environment.
2) Museum experiences support learning by providing opportunities for children to explore with their senses, to make their own decisions, to experience challenges, to learn with and from other people, and to reflect on their own ideas.

Based on these ideas, the museum can provide learners with:
- time and space to learn in their own ways;
- respectful and inspiring learning environments containing multisensory materials and loose parts;
- freedom to choose, to take risks, to fail and try again; and
- encouragement and support from peers and caring adults.

The museum recognizes the connections between active exploration, play, and learning and that the processes share many characteristics.

Creating new “learning frameworks” to replace the old “educational philosophy” required staff to reconcile their individual beliefs with evidence from research in fields from early childhood education to developmental psychology to anthropology. And while staff have always built practices based on such literature, the group aimed to create a shared resource for staff and volunteers that summarizes the museum’s perspective in a single document that supports its educational decisions. For example, research and educational theory support the value of working through challenges for children’s learning and development—and so PCM emphasizes strategies that encourage children to set goals, challenge themselves, and take risks.

By defining what the museum can provide to foster play and learning, the new frameworks also outline a structure for evaluating exhibits and programs and identifying opportunities for improvement. By grounding museum practices more firmly within the research literature, staff can create a common vocabulary to discuss play and learning, in order to voice and achieve the museum’s mission more effectively.

The museum has traditionally drawn on existing research rather than generating its own, but a recent grant from the National Science Foundation (award number 1223777) to Brown University for a collaborative project has allowed the museum to advance its research and evaluation efforts. The project has two major lines of work. On the academic side, Brown’s Causality and Mind Lab is conducting research on the development of scientific thinking and children’s perceptions of their own learning (see sidebar). At the museum, the project team, which includes both authors and other members of the exhibits department, is conducting research and evaluation to better understand what caregivers, children, and informal educators think about learning through play and exploration in exhibits. The museum’s project researcher is jointly appointed as a visiting scholar at Brown, bridging the interests and needs of the two institutions.

Early in the project, the PCM project team evaluated existing exhibit materials and interviewed caregivers about their perceptions of children’s play and learning. Most caregivers agreed with the messages about play and learning presented in the exhibits, and they all agreed that children learned through play in general. However, many were less certain about whether their children learned through play during their time at the museum. Some caregivers felt children didn’t retain much about what they learned during museum visits or that play alone would not lead to “learning.” Others believed that children were learning at the museum but they weren’t sure how to recognize or describe this kind of learning. To the project team, these responses indicated a need to communicate more effectively about the various ways that open-ended play and exploration contribute to children’s learning and development, and the range of supporting roles that adults can play—encouraging, scaffolding, observing and/or letting children play independently. But, recognizing that families visit the museum for different reasons and interact with one another in different ways, the team wanted to emphasize that families don’t have to change their agendas or their behavior in order for children to benefit from museum visits.
For more than a decade, Providence Children’s Museum has partnered with researchers who study children’s learning and development, including the following:

- Dr. David Sobel, professor of cognitive science and psychology at Brown University, and members of his research team at The Causality and Mind Lab study the ways children learn about how things work (cause and effect) and children’s understanding of how people think and learn.
- Dr. Jennifer Van Reet, associate professor of psychology at Providence College, and members of her research team at the college’s Kid Think lab study how different types of play develop in early childhood and how play is helpful to children’s overall development.

Similar to the Living Laboratory® model (see article on page 14), researchers from both labs invite families to participate in active research studies in the museum’s Mind Lab space and share information about their work with caregivers through one-on-one conversations.

The museum’s partnership with Brown University also includes two research projects funded by the National Science Foundation. From 2012-2015, one project (award number 1223777) focuses on the development of metacognition and scientific thinking skills, and includes research and evaluation in museum exhibits alongside research studies conducted in Mind Lab. Beginning in 2015, a second project (award number 1420548), in collaboration with paired university/children’s museum research teams from University of California, Santa Cruz/Children’s Discovery Museum in San Jose, and University of Texas at Austin/The Thinkery will investigate how open-ended exploration and parents’ explanations affect children’s causal learning in each of the three museums, and how museum exhibit design and facilitation can influence parent-child interactions as well as children’s exploration and learning.

The team is using lessons learned from these caregiver conversations to prototype new activities, labels, and print materials that aim to broaden families’ perceptions about what counts as learning during their visits. Based on existing research and input from PCM staff and volunteers, the team identified observable behaviors that relate to children’s developing thinking skills—and in particular, instances when children might be noticing or sharing their thoughts and ideas. When this happens, children may begin to reflect on their own learning, especially if caregivers and educators recognize and support these thought processes. For example, children share ideas by thinking out loud or talking about their discoveries. They also make their thinking visible through nonverbal behaviors, such as expressing frustration if their plans weren’t working out, focusing deeply on their goals, or using trial and error to test and improve something they were working on. Building on this knowledge, the team tested a play observation activity for caregivers that included a list of “thinking behaviors” and a brief description of how each relates to children’s learning, prompting caregivers to watch their children at play and see what they noticed. New versions of exhibit labels also made more explicit the connections between behaviors that caregivers might observe at the museum and children’s underlying thought processes and developing cognitive skills (e.g., “Kids do the same thing over and over to practice what they’re learning”). In both approaches, caregivers said they appreciated having new strategies for noticing their children’s learning and having the language to talk about it.

The museum’s newly renovated Mind Lab, designed for learning about learning, serves as the site for ongoing research studies at PCM and offers a self-guided activity that encourages exploration and experimentation. Labels communicate not only how children learn through experience, exploration, and play, but also research evidence to back up these claims. Illustrated summaries share the findings and implications of individual studies on relevant topics (e.g., how children learn from one another or through sensory experience), including studies completed in Mind Lab by academic partners and by the museum’s internal researcher. Caregivers report learning something new from these synopses and seeing the relevance of the research findings in their own lives.

Perhaps not surprisingly, the project team found that caregivers enjoy helping the museum think about children’s learning and are very curious to understand more about this work, making PCM’s research and evaluation efforts a powerful communication strategy in itself. Through conversations with families, the team has shared not only PCM’s message about the connections between play and learning, but also the depth of thinking that goes into the learning experiences the museum provides, and the research base that supports its efforts. Staff have also discovered that the mere presence of researchers in an exhibit can convey that children’s learning at the museum is worthy of study, often leading visitors to observe children’s play with greater attention and interest.

The project team has committed to communicating the process and findings from their work with other PCM staff and visitors. The team shares regular updates about results and prototyping plans with the public through the museum’s behind-the-scenes blog and its quarterly newsletter, and with PCM staff, volunteers, and board through presentations and informal brown bag discussions. This consistent research presence has contributed to a growing culture of observation at the museum. The research-based implementation of the new learning frameworks will ideally give museum staff across departments more structure for reflecting together about their work, building on their excitement to strengthen an institution-wide culture of reflective practice.

Susan Letourneau, project researcher at Providence Children’s Museum and the Causality and Mind Lab at Brown University, received a PhD in cognitive neuroscience from Brandeis University.

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Identity

Bateson’s book and much of her life’s work draw on the theoretical framework of Erik Erikson and his eight “ages” from the oral/sensory stage of infants to maturity in adults. Each stage is characterized both by strengths (virtues) and potential pathologies. For example, during puberty/adolescence the tension is between identity versus role confusion. In the age of maturity, the tension is between identity versus incompetence. Each stage is characterized by the handing on of accrued wisdom that, she explains, is a new phenomenon in human history and evolution, i.e. the time of life where many more of us have already lived full lives but remain vital and can continue to contribute in significant measure to our families, our communities—our museums! At this individual level, the interview with George Hein in this issue, as well as his recent book, Progressive Museum Practice: John Dewey and Democracy, are excellent examples of the application of “active wisdom” in the museum field.

It takes time, energy, and dedication to be a potential instrument of “active wisdom,” but it also requires a perspective from on high that can see the forest—and even beyond—as well as the trees. For me this implies the valuing of museum philosophy (our core conceptual foundations) and history (the stories we tell about ourselves) as well as the empirical research literature, which, after all is ultimately embedded in either explicit or implicit philosophical positions and within a historical context. This perspective is critical in helping us all be alert and responsive to the currently pervasive and tense dynamics in all sectors of society of the interplay between knowledge, values, and power. We need to discern how these dynamics inform what different individuals and groups, within their various frames of reference, are likely to count as important outcomes, and then how they decide what kind of evidence about those outcomes is convincing. Some knowledge is based on research-derived “evidence,” but, as we in the field all know, and as Bateson affirms (p. 74), our understanding also grows out of the active exercise of honed skills of empathy and imagination. And, not surprisingly, I would suggest that we should apply
this wisdom to all levels of the system.

Since the founding of the Brooklyn Children's Museum in 1899 has us approaching 120 years, is the children's museum field in an age of active wisdom, or is it still in its infancy? Might the development of the research agenda and process be a sign of growing up, that we are now in a “school-age” stage, and our strength is competence but the potential pathology could be a temptation to yield to inertia?

**Wholeness**

Finally, Bateson's book has a chapter called “A Time for Wholeness.” In reading it and thinking about the children's museum research agenda process, I was reminded that we often express our goals as nurturing the whole child. Shouldn’t this concept of wholeness be extended to the wholeness of families, staff, communities, and our profession/field? Isn't this wholeness, deep down, what we really yearn for?

As we move forward with the next steps, I think we need to position the research agenda’s use and merits within a broader context—one that fosters connectivity. Bateson ends the chapter, and I this piece, with this thought: “We compose our lives [organizations, communities, profession] in time, improvising and responding in context, yet weaving threads of continuity and connecting the whole as we move back and forth in memory.” (p. 181)

**What Do We Need to Know?**

**Children's Learning**

- What kinds of learning are effectively facilitated and supported in children's museums (e.g., cognitive learning, emotional growth, social skills, mastery of the physical environment, attitude formation)?
- What foundational knowledge, skills, and experiences for various domains (art, science, etc.) are important and necessary for success at age five, ten, fifteen?
- What types of early learning experiences lead to foundational knowledge and skills needed for success?

**Adult/Child Learning**

- What is the role of strong adult/child relationships in children's development and which aspects of these relationships are children's museums best poised to support?
- What is the impact of children's museums on parents/caregivers and the family as a whole?
- What are the most effective strategies for helping parents understand their roles?

**Ecosystem of Learners**

- Who are the learners in children's museums: children of different ages, caregivers/parents, teachers, staff, others?
- What relationships between children's museums and other learning environments create a healthy learning ecosystem? What is the nature of those relationships?
- In what ways are children's museums essential to the learning ecosystem?

**Call to Action**

Through evidence-generating research, children's museums can demonstrate their impact and increase trust with other organizations in the learning ecosystem. The future of education is shaped daily, and children's museums have a very important role to play in what is to come. Not only is this research agenda intended to initiate new research and evaluation studies and new ways of reporting research and evaluation findings, but it is intended to encourage public and private funders to undertake specific research studies in this field, laying the groundwork for policy changes to support larger roles for children's museums in the learning ecosystem and in community capacity-building.

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Families visiting Madison Children’s Museum (MCM) in Madison, Wisconsin, have dozens of engaging, hands-on exhibits and programs to choose from in this free-choice learning environment. Visitors can explore and invent their way through Possible-opolis, illuminate shapes in the Shadow Room of the Art Studio, or play a fun game about body language with a developmental scientist from the University of Wisconsin-Madison (UW) in Wildernest, the museum’s exhibition for young children. The UW presence in Wildernest is part of MCM’s integration of Living Laboratory®, a collaborative model for educating families about current research in child development through active participation in research studies and one-on-one conversations with scientists.

Living Laboratory®, established in 2005 at the Museum of Science (MOS) in Boston, Massachusetts, is a scalable, flexible model for bringing scientists who study children’s learning and development onto the exhibit floor to educate the public about the “science of kids.” The program began in the Discovery Center; MOS’s early childhood exhibition, as an effort to actively engage adult caregivers in scientific thinking through a topic that dominates their thoughts, time and energy: their children. Child development researchers from local institutions (including Harvard University, Boston College, Boston University, Tufts University, and Boston Children’s Hospital) collaborate with museum staff by bringing studies normally run in their on-campus labs directly onto the exhibit floor. The result: more than 30,000 families have participated in real research as part of their Museum of Science experience.

The National Living Laboratory initiative (NLL) was created in response to requests for help from colleagues in bringing the “science of kids” to their own institutions. In 2011, support from the National Science Foundation allowed MOS to begin broad implementation of the Living Laboratory® model by establishing collaborative partnerships with the University of Wisconsin, provide new opportunities for parent engagement and adult education, and create opportunities for staff and volunteers to access information and training related to child development. Building from the existing and proven Living Laboratory® model made it much easier to forge research partnerships than had we started from scratch.”

For the past three years, Karlen has worked closely with Dr. Kristin Shutts, assistant professor of psychology at the University of Wisconsin-Madison. Twice a week for three hours, Dr. Shutts and her team of graduate and undergraduate students come onto the Wildernest exhibit floor and invite families to participate in quick, fun studies that explore children’s learning and development. “We are interested in understanding how young children sort out all the complexities of the social world,” says Shutts. “What factors guide children’s social actions toward others such as decisions about whom to help, befriend, and trust? And how do they figure out how other people are connected to one another—friends or foes, bosses or subordinates, or members of different social groups? We probe their understanding of relationships by showing simple displays to them and asking them different questions.”

Living Laboratory® works at the intersection of, and directly benefits, three distinct audiences: museum visitors, museum educators, and scientists. Museum visitors learn about current research happening in their community through participation in active studies and conversations with local scientists. Museum educators and scientists learn from each other through ongoing mutual professional development opportunities, in which scientists learn methods to more effectively communicate their research to the public and museum educators learn about the most cutting edge research in the field of child development.

Living Laboratory® studies are conducted out in the open, as part of a dynamic exhibit environment, as opposed to a private area away from the museum floor. The goal is to increase the visibility of and access to research experiences in an effort to
break down barriers between scientists and the public. The challenge for scientists is creating research studies that are quick and interactive enough to captivate the interest of child and adult visitors alike, while still addressing the scientific question elegantly. Through her time collaborating with MCM, Dr. Shutts has designed dozens of studies that fit well within the museum environment. “In a recent study completed at MCM,” Shutts says, “we showed children a brief video of a conversation between one person who acted in a way that suggested a high position of social power (e.g., chest puffed out, shoulders back) and another person who acted in a way that suggested a lower position of power (e.g., head down). Then, we asked children to guess which person was ‘in charge.’ We found that children as young as five years of age were surprisingly good at using body language to figure out which person was higher in power.” The results of this research were recently published in the journal *Child Development*.

In some cases, Living Laboratory® studies are a small part of a larger research question which may span the museum, university lab, preschools, parks, etc. In other cases, they are pilot studies designed to be conducted only at the museum. Study topics, methodology, and research questions are determined by the scientists and then submitted to the museum for approval. To conduct a study through a Living Laboratory® site, researchers must submit study proposals to the museum that include evidence of ethical approval from their university’s Institutional Review Board, museum-specific consent forms for parents and guardians, and any educational materials they plan to distribute. Once the study has been approved, all researchers who will be interacting with the public go through a thorough orientation before they set up a study any exhibit. Ongoing—typically weekly—mutual professional development opportunities occur among researchers and museum educators at the beginning of each research shift.

Engaging adult audiences in children’s exhibits is a challenge for many children’s museums and science centers. Living Laboratory® provides an immersive experience for families that focuses on adult education but is still fun for children. “Living Lab provides ongoing opportunities for parents and caregivers to interact with guest ‘experts,’ and children and adults alike are excited to help with research studies,” says Karlen.

Scientists and museum educators learn to improve their practices through Living Laboratory’s® mutual professional development opportunities. Karlen: “The presence of Living Lab® researchers and programming in *Wilderness* has been tremendously beneficial to volunteers and staff, many of whom are more experienced working with school-age children than with very young children. Involvement with Living Lab®, researchers and use of research toys provide ongoing opportunities for volunteers and staff to become more knowledgeable in child development topics and more confident interacting with visitors in *Wilderness*. The result is a more engaged staff presence in the museum, and more opportunities for staff and volunteers to work as educators while on the floor.”

Scientists have also found a variety of benefits to collaborating with museums including increasing dissemination of their research beyond the academic community to the general public, gaining access to a more diverse pool of participants, and improving undergraduate and graduate student communication practices through the mutual professional development program. “We have the opportunity to interact and connect with families who have never participated in research before either because they have never heard about it, or because they don’t have a lot of spare time to bring their child into our lab for studies,” says Dr. Shutts. “Additionally, both graduate and undergraduate students have the chance to practice explaining their research to the public. They learn to articulate exactly how and why their work is important; that skill is really useful when it comes to writing grants and recruiting participants for future research.”

Museum professionals interested in collaborating with scientists to bring cutting edge child development research to their exhibit floors can join the Living Laboratory® community. Community members can access the NLL website (www.livinglab.org) to find an academic collaborator, learn about NLL events, download professional development resources, or create their own “research toys” (fun, educator-facilitated, hands-on activities based on completed research studies). To date, the online community includes over 400 museum professionals and academics from around the world. “The benefits of participating in the national community have had a ripple effect in our museum,” Karlen says. “The relationships built with museums and colleagues across the country have not only strengthened our Living Laboratory® program, but have enabled our team to build stronger connections with our museum partners, and particularly with science museums.”

As with any museum program, sustainability is definitely a challenge. The National Living Laboratory Project Team encourages conversations about future sustainability between professors and museum staff early and often. It is hoped that Living Laboratory® collaborations may open new funding opportunities that weren’t considered before.

In October 2014, eighteen NLL community members, including twelve children’s museums, were awarded Living Laboratory® stipends of up to $3,000 to either integrate Living Laboratory® for the first time at their institution, or enhance the educational impact of an already established Living Laboratory® program. Please Touch Museum® (Philadelphia, Pennsylvania) received a stipend to establish a new collaboration with the Monell Chemical Senses Center, an independent research institution. “After learning about the program, we were fascinated by the model of connecting museum visitors and working scientists,” says Alice Gonglewski, associate director of family learning. “As our mission in a nutshell is *learning through play*, we like the play-based research activities. Children enjoy the interactions and are easily engaged in the tasks.
Adult caregivers as well as museum staff are interested in studies that offer opportunities for them to ask questions and learn from the researchers directly. This attractive partnership model offers a good balance of benefits for both parties. The museum supports scientists by providing access to larger numbers of study participants and also helps researchers hone their delivery and interaction skills. Museum visitors and staff get a front row seat to the process of scientific inquiry. Living Lab® is a great way to make science meaningful and accessible to visitors and support our STEAM learning initiatives. Our museum strives to connect with Philadelphia’s rich community of academic institutions and working scientists, and Living Lab® gives us an opportunity to do that in a very mission-driven way.”

Karlen says it best: “Children’s museums are grounded in child development pedagogy and spark lifelong learning, making them a natural fit for the Living Lab® model. It is easy to make a case for starting a Living Lab® partnership to museum leadership because it provides opportunities such as parent education and professional development for staff that many children’s museums want but struggle to fund. The National Living Laboratory initiative provides myriad resources for museums of any size, and the professional network makes it easy to seek and share advice.”

To learn more about Living Laboratory®, or to join the community, please visit www.livinglab.org.

Marta Biarnes is the professional development associate, Museum of Science, Boston and co-principal investigator, National Living Laboratory. Becki Kipling is the Discovery Center program manager, Museum of Science, Boston, and principal investigator, National Living Laboratory.