

July 25-26, 2008
Washington, DC

ISE PI SUMMIT 2008

*Increasing the Impacts and Communicating
the Value of Informal Science Education*



caise



NATIONAL SCIENCE FOUNDATION

4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230



OFFICE OF THE
ASSISTANT DIRECTOR
FOR EDUCATION AND
HUMAN RESOURCES

Dear 2008 Informal Science Education Principal Investigators Summit Participants:

On behalf of the Directorate for Education and Human Resources at the National Science Foundation (NSF), I want to welcome you to the 2008 Informal Science Education (ISE) Principal Investigators Summit, led by the Division of Research on Learning in Formal and Informal Settings (DRL). The Summit's theme, Increasing the Impacts & Communicating the Value of Informal Science Education, resonates with NSF's Strategic Outcome Goal on Learning, *Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens*. Your participation in this Summit is a reflection of your dedication to this goal and to improving the STEM learning enterprise.

One impressive characteristic of the informal science education field is its diversity, with respect to the kinds of goals and visions it embraces, the projects that are conducted, the variety of organizations involved, the backgrounds of professionals, and the audiences it serves. It has often been noted that creative work thrives on diversity, and the field's commitment to innovation and collaboration certainly bears witness to that. We fully expect that the Summit, being representative of the range of NSF/ISE-funded projects, will be an opportunity for you, and for us, to learn from and be inspired by one another.

We welcome your comments and suggestions as we all strive to increase the impacts and communicate the value of informal science education.

Sincerely,

A handwritten signature in cursive script that reads "Cora B. Marrett".

Cora B. Marrett
Assistant Director

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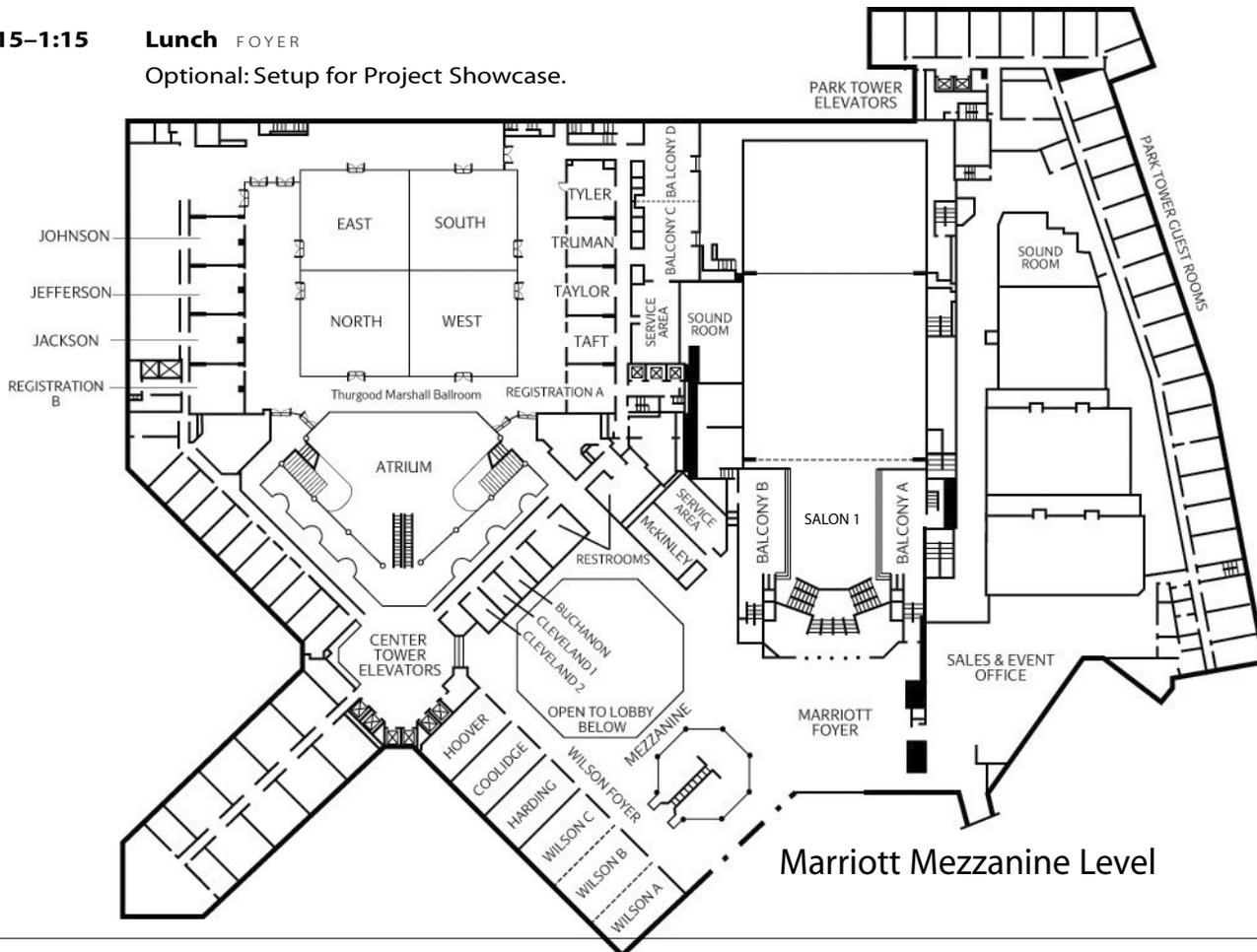
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AGENDA-AT-A-GLANCE

FRIDAY July 25, 2008

- 8:00–9:00** **Registration** MARRIOTT FOYER, MEZZANINE LEVEL
Optional: Setup for Project Showcase.
- 9:00–10:00** **Opening Plenary Session** SALON 1
Welcome & Introductions
Featured Speakers —
Cora Marrett, NSF, and **Joan Ferrini-Mundy, NSF**
Getting Involved with CAISE
- 10:00–10:30** **Morning Refreshments** FOYER
Optional: Register for InformalScience.org and ExhibitFiles.org.
- 10:30–12:15** **Morning Plenary Session** SALON 1
Informal Science Education Town Hall Meeting
The Forthcoming National Research Council (NRC) Report on
Learning Science in Informal Environments
- 12:15–1:15** **Lunch** FOYER
Optional: Setup for Project Showcase.

AGANDA-AT-A-GLANCE



1:15–2:30 Breakout #1 (Concurrent Sessions)**Workshops**

Visitor Studies 101: Evaluating Impact TAFT ROOM

Beyond Counting Hits: Strategies for Evaluating ISE Websites BALCONY A

Financial Practices and Reporting: Strategies and Tools to Support Good Business Practice BALCONY B

Discussion Groups

More Time, More Money, More Freedom: The Three Secrets to Successful Collaboration Across Institutions and Industries TAYLOR ROOM

Integrating Traditional Ways of Knowing with Western Science SALON 1, TABLE 1

Public Engagement with Science: An Emerging Role for ISE? TRUMAN ROOM

Environmental Literacy: Taking Action through ISE TYLER ROOM

ISE Project Monitoring System: Individual Sessions SALON 1, TABLES 2 & 3

2:30–4:00 Project Showcase & Refreshments

See handout for project locations.

4:00–5:15 Breakout #2 (Concurrent Sessions)**Workshops**

Methods and Instruments: How About Tools? TAFT ROOM

Evaluation 101: Everything You Need to Know to Get Started BALCONY A

Financial Practices and Reporting: Strategies and Tools to Support Good Business Practice BALCONY B

Discussion Groups

Religion and Science: Beyond the Evolution-Creationism Wars SALON 1, TABLE 1

Public Participation in Research: Citizen Science and Beyond TAYLOR ROOM

Portraying Science as a Human Endeavor TRUMAN ROOM

Learning Across Formal and Informal Settings: How Do We Connect? TYLER ROOM

ISE Project Monitoring System: Individual Sessions SALON 1, TABLES 2 & 3

5:15–5:45 Afternoon Plenary Session SALON 1

Thoughts from Today and for Tomorrow

5:45–6:30 Free Time & Walk to the National Zoo**6:30–9:00 BBQ Dinner at the National Zoo GREAT MEADOW**

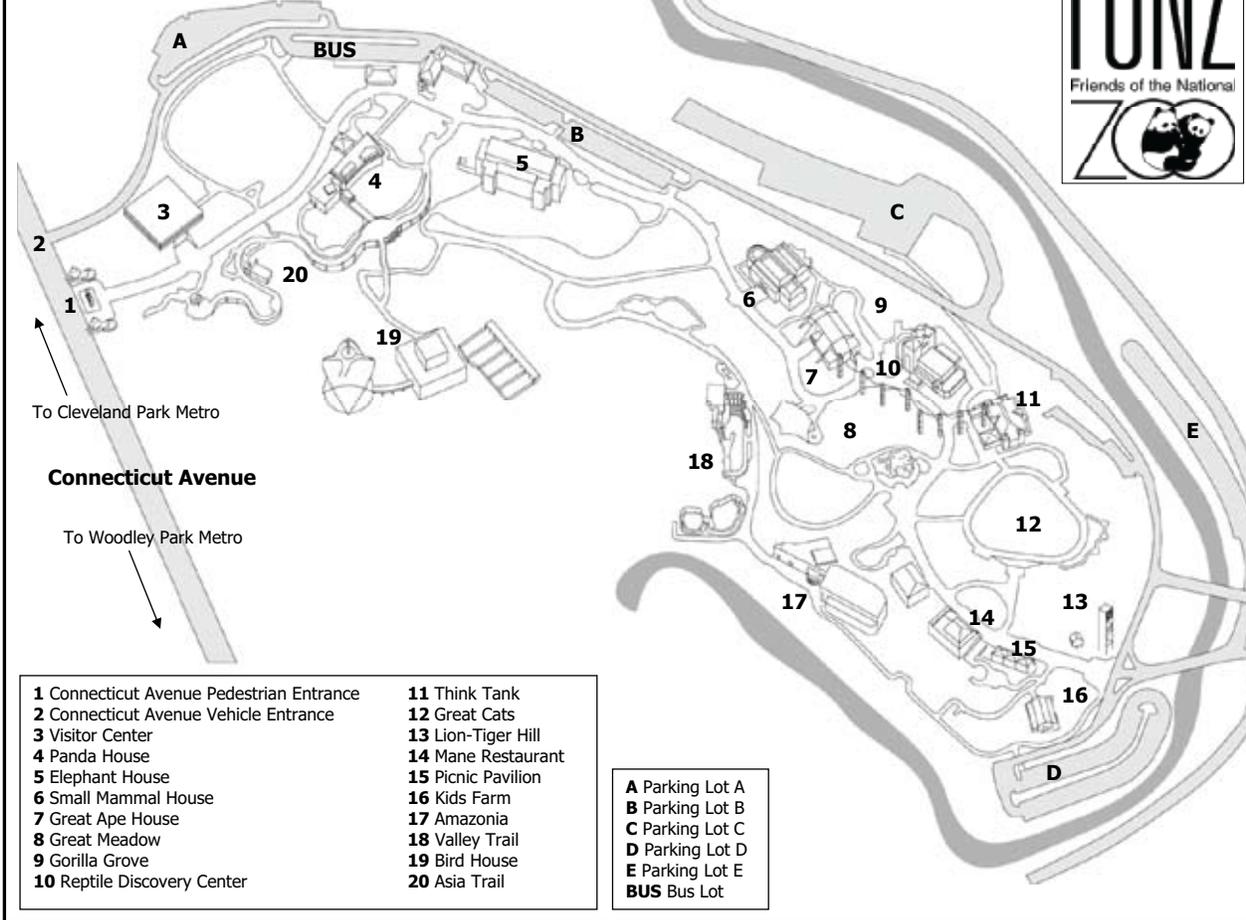
Cash bar; musical instruments welcome

AGENDA-AT-A-GLANCE

SATURDAY July 26, 2008

- 6:00** **National Zoo Grounds Open**
- 8:00–9:00** **Continental Breakfast** NATIONAL ZOO VISITOR CENTER
- 9:00–11:00** **Morning Plenary Session** NATIONAL ZOO VISITOR CENTER AUDITORIUM
CAISE and Its Work
Discussing the *Framework for Evaluating Impacts of Informal Science Education Projects*
- 11:00–12:30** **Box Lunch**
Optional: Setup for Project Showcase at Marriott.
- 11:15–12:15** **Education at the National Zoo: A Walking Tour** NATIONAL ZOO VISITOR CENTER
This tour is limited to 20 people.
- 12:30–1:00** **Walk to Marriott**
- 1:00–2:15** **Breakout #3 (Concurrent Sessions)**
Discussing the *Framework for Evaluating Impacts of Informal Science Education Projects*
See the signs at the registration table for topic locations.
- 2:15–3:45** **Project Showcase & Refreshments**
See handout for project locations.
- 3:45–5:00** **Breakout #4 (Concurrent Sessions)**
- Workshops**
- Ethical and Practical Solutions for Evaluation Studies TAFT ROOM
"Big Ideas" for ISE Projects BALCONY A
Working with the ISE Project Monitoring System BALCONY B
- Discussion Groups**
- Sustaining Access to ISE for People with Disabilities SALON 1, TABLE 1
Bringing New Visualization Technologies into ISE Institutions TAYLOR ROOM
Knowing When and How to Scaffold Learning: A Dialogue about
Teaching and Learning Using Digital Data TRUMAN ROOM
Taking ISE to the Next Level: What Happens After the Sound Bite? SALON 1, TABLE 2
Assessing the Impacts of Online Professional Communities
for Informal Science Education TYLER ROOM
Working with Your Program Officer SALON 1, TABLE 4
- 5:00–5:30** **Closing Plenary Session** SALON 1
Increasing the Impacts and Communicating the Value of Informal Science Education

The Zoo is located at
3001 Connecticut Avenue NW
Washington DC 20008



AGANDA-AT-A-GLANCE

Smithsonian National Zoological Park

SESSIONS for Friday, July 25

Registration 8:00–9:00 a.m.

Marriott Foyer (Mezzanine Level)

Optional: Setup for Project Showcase.

Opening Plenary Session 9:00–10:00 a.m.

Salon 1

Welcome & Introductions

Wendy Pollock, *CAISE PI, Association of Science-Technology Centers*

Al DeSena, *Coordinator, Lifelong Learning Cluster, Division of Research on Learning in Formal and Informal Settings, NSF*

Featured Speakers

Cora Marrett, *Assistant Director, Directorate for Education and Human Resources, NSF*

Joan Ferrini-Mundy, *Division Director, Division of Research on Learning in Formal and Informal Settings, NSF*

Getting Involved with CAISE

Kevin Crowley, *CAISE Co-PI, University of Pittsburgh*

Morning Refreshments 10:00–10:30 a.m.

Foyer

Optional: Register for InformalScience.org and ExhibitFiles.org.

Morning Plenary Session 10:30 a.m.–12:15 p.m.

Salon 1

Informal Science Education Town Hall Meeting

NSF ISE Program Officers

The Forthcoming National Research Council (NRC) Report on Learning Science in Informal Environments

Sue Allen, *Exploratorium*

Bruce Lewenstein, *Cornell University*

Tom Keller, *National Academy of Sciences*

Lunch 12:15–1:15 p.m.

Foyer

Optional: Setup for Project Showcase.

Breakout #1 1:15–2:30 p.m.

(Concurrent Sessions)

There are three workshops and five discussion groups to choose from for Breakout #1. Please note that the Financial Practices workshop is repeated in Breakout #2.

WORKSHOPS

Visitor Studies 101: Evaluating Impact

Ellen Giusti
Independent Consultant

Taft Room

Your project is in a museum or science center, and you know how to create good programs and exhibits. But now NSF is asking you to evaluate the impact of those programs and exhibits. Where do you start? With Visitor Studies 101.

This workshop will introduce the four basic phases of evaluation: (1) front-end, used during design development, (2) formative, used during design implementation, (3) remedial or corrective, and (4) summative. Participants will learn how to establish a project's learning goals and then use the new NSF report, *Framework for Evaluating Impacts of Informal Science Education Projects*, to measure what they have achieved.

This workshop will provide participants with an overview of exhibition and program evaluation, beginning with the differences between basic research and program evaluation. Attendees will learn that funders' requirements are not the only or even the principal reason to conduct evaluation—rather, evaluation is the “right thing to do” for anyone concerned with successful outcomes in informal education. Attendees will come away with the basic concepts and tools needed to work with a professional evaluator. To be defined and discussed: evaluation terminology, quantitative vs. qualitative methods, and the pros and cons of various data collection and analysis approaches.

Visitor Studies 101 will have an informal seminar-type format rather than a lecture, with plenty of opportunity for questions and comments from the participants. Participants will take away a substantial handout developed by the presenter in collaboration with Smithsonian Institution colleagues Zahava Doering and Andrew Pekarik.

Beyond Counting Hits: Strategies for Evaluating ISE Websites

Saul Rockman
Rockman et al

Jennifer Borse
Rockman et al

Balcony A

People are clicking on your ISE website. What does that actually tell you about the impact your site is having on the public understanding of science and technology?

In this workshop, participants will be introduced to the range of issues in and approaches for the evaluation of ISE websites. As part of this workshop, presenters will provide participants with a worksheet to help them define the outcomes they want from their websites and the kinds of data that can be used to capture impacts and outcomes. The presenters seek to narrow the range of expectations to those that are more realistic and to encourage efforts that identify meaningful short- and long- term outcomes rather than just counting hits, page views, stickiness, and other trivial data. For summative outcomes, the focus will be on what data can be captured on the websites, what can be linked to web interactivity, and what can lead to offsite actions that can be tied back to the site. Examples will include ISE websites for media and museums.

The workshop will introduce participants to a wide variety of evaluation tools and practices, including open source tools and proprietary ones. Among the topics discussed will be evaluation planning, user profiles, formative evaluation, beta tests, usability/navigation, universal design, web log analysis, assessments of learning, and off-site actions.

Financial Practices and Reporting: Strategies and Tools to Support Good Business Practice

Pamela Hawkins
Division of Grants and Agreements, NSF

Tarsha Johnson
Division of Grants and Agreements, NSF

Carol Orlando
Cost Analysis and Audit Resolution Branch, NSF

Beatriz Azor
Cost Analysis and Audit Resolution Branch, NSF

Balcony B

Sound financial practices and reporting are crucial to effective grant management. This workshop, led by staff from NSF's Office of Budget, Finance, and Award Management (BFA) Division of Grants and Agreements (DGA) and Cost Analysis and Audit Resolution Branch (CAAR), focuses on NSF financial management, requirements, and the strategies and tools to help make the process effective and (relatively) painless. Examples of tools and good practice are included. Questions are welcome.

DISCUSSION GROUPS

More Time, More Money, More Freedom: The Three Secrets to Successful Collaboration Across Institutions and Industries

Jared Lipworth
Thirteen/WNET

Taylor Room

No, this is not a marriage counseling session. Building on an informal presentation of case studies from the outreach efforts for two public television projects (*Innovation* and *The Human Spark*), this session will explore the obstacles to successful collaboration between television producers and science museums, as well as the benefits to each organization when these obstacles are overcome. Join us for a frank discussion about what works, what doesn't, and what we can all do better.

Integrating Traditional Ways of Knowing with Western Science

Bonnie Sachatello-Sawyer
Hopa Mountain

Salon 1, Table 1

In this roundtable, we will discuss best practices for integrating traditional ways of knowing with Western science in informal science education programs. Insights from Hopa Mountain, a nonprofit that invests in rural and tribal citizen leaders who are working to improve education, ecological health, and economic development, and the NSF-funded Native Science Field Centers project will start the conversation.

Public Engagement with Science: An Emerging Role for ISE?

Larry Bell
*CAISE Inquiry Group Leader,
Science Museum, Boston*

Bruce Lewenstein
Cornell University

Cynthia Needham
ICAN Productions

Truman Room

How are ISE projects stepping beyond the traditional goals of increasing public understanding of the natural and humanmade worlds as well as beyond the traditional approaches of one-way communication and discovery learning? In this discussion session, we will identify the goals and techniques that drive "public understanding of science" (PUS) and those that drive "public engagement with science" (PES). Participants from all sectors of ISE are invited to share experiences and brainstorm ideas about ISE projects that facilitate more open exchanges between science and society.

This session will inform a CAISE Inquiry Group on PES that will lead to several products, including a white paper on PES and recommendations to funders.

Environmental Literacy: Taking Action through ISE

Linda Rhoads

*Environmental Education
Association of Oregon*

Ari Epstein

*Massachusetts Institute of
Technology*

Tyler Room

Climate changes, air and water concerns, and other environmental challenges are pressing and complex issues. Our leaders and residents face the challenge of balancing the economies within which we thrive, the communities where we reside, and the natural resources on which we depend. What roles can ISE play in addressing environmental literacy?

ISE Project Monitoring System: Individual Sessions

Gary Silverstein

Westat

John Wells

Westat

Salon 1, Tables 2 & 3

Staff from Westat will be available to meet with individual ISE projects that (1) have questions about their submissions to the Project Monitoring System, (2) have questions about their project's impacts and indicators, (3) would like to discuss their upcoming submissions, and/or (4) would like to provide feedback on the navigation and/or content of the online system.

Project Showcase & Refreshments 2:30–4:00 p.m.

See handout for project locations.

Breakout #2 4:00–5:15 p.m.

(Concurrent Sessions)

There are three workshops and five discussion groups to choose from for Breakout #2.

WORKSHOPS

Methods and Instruments: How About Tools?

Terrie Nolinske
TNI Consultants LLC

Taft Room

Evaluating the impact of informal science education projects isn't easy. Fortunately, there are a variety of methods available that can be used by project leaders to assess program efficacy.

This workshop will include an overview of methods used in data collection with an emphasis on in-person interviews, telephone interviews, focus groups, and questionnaires. Methods such as journals, portfolios, and observations with follow-up interviews may also be discussed. Participants will work in small groups to identify the advantages and disadvantages of each method of evaluation and will share their findings with the group at large. Participants will examine resources related to survey research and evaluation, including online sources.

The format for this workshop is interactive and hands-on. Lecturettes will alternate with discussions, case studies, and individual and group activities, such as reflections and problem solving. Participants are encouraged to bring examples of instruments they have used or are using. They are also encouraged to share their experiences and start to apply what they learn to their respective settings during the workshop. Participants will leave with a comprehensive set of handouts and resources.

Evaluation 101: Everything You Need to Know to Get Started

Saul Rockman
Rockman et al

Jennifer Borse
Rockman et al

Balcony A

You know almost exactly what you want to do to improve the public understanding of science and technology. But you don't have much of an idea about how to start to evaluate your project, to improve its effectiveness, and then to prove its success. Evaluation 101 to the rescue.

This workshop will begin with "Why do an evaluation?" and "What is an evaluation?" and quickly follow with "How would this work with a planetarium show, website, or television show?" We will help participants identify the products or processes in their ISE initiatives. The rationale will include interactive discussions of the value of improving the product, communicating its impact or value, responding to questions about the initiative, clarifying the content and presentations to better serve the needs of the audience, and building the next program or media product.

The workshop will be based on the content of EvaluationSpringboard.org, an existing, freely available, and accessible website. Topics include creating a logic model, formulating and prioritizing evaluation questions, human subjects and informed consent, identifying evaluation types, identifying evaluation methods, planning for and collecting data, analyzing and interpreting data, and reporting and using findings. The labs match the content covered in the recent *Framework for Evaluating Impacts of Informal Science Education Projects*.

Financial Practices and Reporting: Strategies and Tools to Support Good Business Practice

Pamela Hawkins

Division of Grants and Agreements, NSF

Tarsha Johnson

Division of Grants and Agreements, NSF

Carol Orlando

Cost Analysis and Audit Resolution Branch, NSF

Beatriz Azor

Cost Analysis and Audit Resolution Branch, NSF

Balcony B

Sound financial practices and reporting are crucial to effective grant management. This workshop, led by staff from NSF's Office of Budget, Finance, and Award Management (BFA), Division of Grants and Agreements (DGA), and Cost Analysis and Audit Resolution Branch (CAAR), focuses on NSF financial management, requirements, and the strategies and tools to help make the process effective and (relatively) painless. Examples of tools and good practice are included. Questions are welcome.

DISCUSSION GROUPS

Religion and Science: Beyond the Evolution-Creationism Wars

Tom Rockwell

Exploratorium

Salon 1, Table 1

How do these two cultural forces—religion and science—coexist, collide, and cooperate?

Public Participation in Research: Citizen Science and Beyond

Rick Bonney

*CAISE Inquiry Group Leader,
Cornell Lab of Ornithology*

Taylor Room

Laypeople have been collecting scientific information for decades. However, data collection projects that allow participants to learn science content and processes while helping to generate scientific knowledge is more recent. Such efforts include citizen science, community science, civic science, and participatory action research. How can these and related projects involve the public in comprehensive investigations that include all of the steps in the scientific process—not just collecting

data, but also analyzing and interpreting it, discussing results, drawing conclusions, and asking new questions? Bring your ideas to help shape a CAISE Inquiry Group that will lead to several products, including a white paper and recommendations to funders.

Portraying Science as a Human Endeavor

Jim Metzner
Jim Metzner Productions, Inc.

Jeremy Monroe
Freshwaters Illustrated

Truman Room

Sharing science can include more than “science content.” It can focus on processes and passions that drive scientists. For three years the *Pulse of the Planet* radio series has equipped scientists to record audio diaries and write blogs. Both of these techniques provide an insider’s view of the scientific endeavor. Through television, Freshwaters Illustrated has explored ways scientists can share their passion for science, while remaining cognizant of their credibility and reputation. Join PIs from these two NSF funded ISE projects to explore lessons learned and future possibilities.

Learning Across Formal and Informal Settings: How Do We Connect?

Bronwyn Bevan
*CAISE Inquiry Group Leader,
Exploratorium*

Diane Miller
St. Louis Science Center

Tyler Room

Science is perceived by many as a set of facts and procedures that requires prodigious memorization skills and shirts that carry pocket pens. This conception of science is developed, in large part, by the way science is taught and experienced in schools. People who come to our institutions might have other ideas about science, but what about those that don’t? How can informal science institutions contribute to the reshaping of science education in school and afterschool settings so that it becomes more meaningful, relevant, and engaging for more people, particularly those who are under-represented in the sciences?

A CAISE Inquiry Group is forming to develop a white paper, with recommendations for funders, that will explore how informal science institutions and schools can work together to transform how science is experienced and learned by children in the nation’s classrooms and afterschool programs. Help us shape this paper by joining us to identify the important questions, conflicts, and opportunities that need to be considered.

ISE Project Monitoring System: Individual Sessions

Gary Silverstein
Westat

John Wells
Westat

Salon 1, Tables 2 & 3

Staff from Westat will be available to meet with individual ISE projects that (1) have questions about their submissions to the Project Monitoring System, (2) have questions about their project’s impacts and indicators, (3) would like to discuss their upcoming submissions, and/or (4) would like to provide feedback on the navigation and/or content of the online system.

Afternoon Plenary Session 5:15–5:45 p.m.

Salon 1

Thoughts from Today and for Tomorrow

John Falk
*CAISE Co-PI, Oregon State
University*

This is your opportunity to provide formative feedback in preparation for Day 2 of the ISE PI Summit 2008.

Free Time & Walk to the National Zoo 5:45–6:30 p.m.

BBQ Dinner at the National Zoo 6:30–9:00 p.m.

Great Meadow at the National Zoo

Cash bar; instruments welcome

SESSION for Saturday, July 26

National Zoo Grounds Open 6:00 a.m.

National Zoo

Wander the grounds of the National Zoo. Note: While the grounds open at 6 a.m., animal houses open at 10 a.m.

Continental Breakfast 8:00–9:00 a.m.

National Zoo Visitor Center

Morning Plenary Session 9:00–11:00 a.m.

National Zoo Visitor Center Auditorium

CAISE and Its Work

Ellen McCallie, *CAISE Director*

Discussing *Framework for Evaluating Impacts of Informal Science Education Projects*

David Ucko, *Deputy Director, Division of Research on Learning in Formal and Informal Settings, NSF*

Alan Friedman, *CAISE Co-PI, Visitor Studies Association*

Sue Allen, *Exploratorium*

Lynn Dierking, *Oregon State University*

Gary Silverstein, *Westat*

Al DeSena, *Coordinator, Lifelong Learning Cluster, Division of Research on Learning in Formal and Informal Settings, NSF*

Box Lunch 11:00 a.m.–12:30 p.m.

National Zoo Visitor Center

Optional: Setup for Project Showcase at Marriott.

Education at the National Zoo: A Walking Tour 11:15 a.m.–12:15 p.m.

Amy Miller
*Education Manager, Friends
of the National Zoo*

Visitor Center

This tour is limited to 20 people.

Walk to Marriott 12:30–1:00 p.m.

Breakout #3 1:00–2:15 p.m.

(Concurrent Sessions)

Discussing the *Framework for Evaluating Impacts of Informal Science Education Projects*

See signs at the registration table for topic locations.

Project Showcase & Refreshments 2:15–3:45 p.m.

See handout for projects and locations.

Breakout #4 3:45–5:00 p.m.

(Concurrent Sessions)

There are three workshops and six discussion groups to choose from for Breakout #4.

WORKSHOPS

Ethical and Practical Solutions for Evaluation Studies

Josh Gutwill
Exploratorium

Taft Room

With the line between research and evaluation blurring, more ISE projects are employing evaluation and must now meet formal requirements for protecting human subjects. What ethical and legal considerations do you need to take into account in order to evaluate the effectiveness of your work in informal science education? What steps should you take to deal with the federal government's requirements? In this workshop, we will discuss a range of topics related to these requirements and how PIs can effectively address them.

By reviewing different evaluation scenarios, participants will consider the ethical tensions that commonly emerge in informal learning environments. For example, how can we adequately protect the privacy of visitors, participants, or viewers while still capturing the details of their interactions? How can we obtain informed consent to participate without disrupting the experience in the free-choice learning setting?

Participants will leave the workshop with an understanding of when and how to apply the federal guidelines for the protection of human subjects and how to work well with IRBs.

“Big Ideas” for ISE Projects

Beverly Serrell
Serrell and Associates

Balcony A

You are an informal science education professional, and you have a proposal or a grant for an NSF-supported project. That’s fine, but what’s your Big Idea?

The concept of a “Big Idea” is widely applicable to many informal science education programs. Similar to a thesis statement, a big idea clearly delineates the content and subject of the program you are offering. Stated as a sentence, it gives the subject momentum and direction. The benefits of having a Big Idea are many: Visitors, viewers, or participants in an ISE program enjoy clearer messages and better program organization, and ISE professionals share a clearly articulated vision for the program. One of the most important functions of a Big Idea is what it tells you to leave out.

The workshop will include a presentation of the background and current issues, discussion of a hand-out of Big Idea exemplars, and plenty of time for Q&A.

Working with the ISE Project Monitoring System

Gary Silverstein, *Westat*
John Wells, *Westat*

Balcony B

Staff from Westat will present preliminary findings from the pilot study of the ISE Project Monitoring System. During this session, they will also be discussing the challenges that projects encountered—most notably delineating measurable impacts and indicators for their projects. Finally, they will be soliciting feedback from projects about additional assistance and guidance that would enhance the capacity of projects to respond to individual items (or the overall system).

DISCUSSION GROUPS

Sustaining Access to ISE for People with Disabilities

Ellen Rubin
*CAISE Inquiry Group Leader,
Consultant*

Christine Reich
*CAISE Inquiry Group Leader,
Museum of Science, Boston*

Mary Ann Steiner
University of Pittsburgh

Salon 1, Table 1

A number of NSF-funded ISE projects have made efforts to increase access to ISE for people with disabilities. What are the features of successful projects, and what conditions make it likelier that these efforts will be sustained? Come connect with others working in this arena, share your experiences, and contribute to the work of a CAISE Inquiry Group on accessibility. The group will report findings and recommendations later this year.

Bringing New Visualization Technologies into ISE Institutions

Patrick Hamilton
Science Museum of Minnesota

Taylor Room

Remote sensing devices (from seismometers to satellites) now collect gigantic streams of data that monitor the daily status of our planet. Communication/computer systems and networks translate these data into visual representations. Scientific visualizations are powerful tools for aiding researchers in increasing scientific understanding our world. How might these tools (e.g., Science on a Sphere™, Rain Table, Geowall, Corewall) be used to translate large datasets into ISE experiences that are compelling and meaningful to our audiences? Can the inherent digital nature of this technology reduce upfront production costs and shorten the time needed to produce new science content while also enabling wider and faster distribution? What roles might the ISE community play in ensuring that large datasets and scientific visualizations benefit large public audiences?

Knowing When and How to Scaffold Learning: A Dialogue about Teaching and Learning Using Digital Data

Judith Lombana
Museum of Science and Industry, Tampa

Truman Room

Doris Ash
University of California Santa Cruz

We ask one of the central questions in learning and teaching in informal settings: How can we help ISE educators to know how and when to scaffold social activity of groups and individuals during their activities in places like museums, gardens, zoos, and aquariums? This discussion group will explore the following questions using video and audio data gathered at the Museum of Science and Industry at the *Kids in Charge* exhibition.

1. Noticing family dynamics—how to “read” social activity
2. Knowing when to interact—how to understand when to interact based on a preliminary read
3. Knowing how to interact—how to know when it is appropriate to guide families to specific content or when to help them problem solve.

Taking ISE to the Next Level: What Happens After the Sound Bite?

Thomas Antonio
College of Sante Fe

Salon 1, Table 2

After your grant is over and the excitement begins to diminish, how do you keep the science fresh and exciting for both the staff delivering the message and the public who receives it? What works? What doesn't? Come share both your successes and your challenges.

Assessing the Impacts of Online Professional Communities for Informal Science Education

Marti Louw

*CAISE Inquiry Group Leader,
University of Pittsburgh*

Kevin Crowley

*CAISE Co-PI, University of
Pittsburgh*

Tyler Room

Do online communities aimed at professional audiences have field-changing effects? In May, the University of Pittsburgh Center for Learning in Out-of-School Environments (UPCLOSE) hosted a two-day CAISE Inquiry Group on the topic of assessing the impacts of online professional communities for informal science education. In this discussion group, we will share our findings and continue the conversation about the potential value and impact of online communities. What would you consider evidence of success for an online community and how we can measure it? What are the right units of analysis to consider when measuring the impacts of online communities—the individual, the group, or the field? Do the impact categories described in the new *Framework for Evaluating Impacts of Informal Science Education Projects* capture the collective efficacy, participatory, and social capital aspects of what online communities might offer?

Working with Your Program Officer

Valentine Kass

Program Director, NSF

Salon 1, Table 4

Are you new to NSF ISE awards? Do you have questions about annual reports or working with your program officer? Drop by for informal conversation.

CLOSING PLENARY SESSION 5:00–5:30 P.M.

Salon 1

Increasing the Impacts and Communicating the Value of Informal Science Education

Wendy Pollock, *CAISE PI, Association of Science-Technology Centers*

Al DeSena, *Coordinator, Lifelong Learning Cluster, Division of Research on Learning in Formal and Informal Settings, NSF*

PROJECTS

Award #	Title	Project Representatives
9901978	Lives In Science	David Condon
9909405	"The Human Body" - A Large Format Film	Greg Andorfer
0000636	Parent Partners in School Science (PPSS)	Dale McCreedy
0103678	A Proposal to Support the Next Generation of Curriculum Materials in Science, Mathematics and Technology	Mary Koppal
0104478	Outdoor Exploratorium: Experiments in Noticing and Understanding	Tom Rockwell
0104700	"Peep and the Big Wide World:" A Television Science Series for Three to Five Year Olds	Kate Taylor Blyth Lord
0104732	Exploring Time Television	Richard Hudson Robert Hone
0119787	Center for Informal Learning and Schools	Bronwyn Bevan
0125417	Elementary, Secondary, and Informal Education: "Invention at Play"	Monica Smith
0125633	Elementary, Secondary, and Informal Education: Birds in the 'Hood / Aves del Barrio	Rick Bonney
0125652	Elementary, Secondary and Informal Education: Conceptualizing and Assessing Web-based Informal Science Learning	Kevin Crowley
0125740	Elementary, Secondary, and Informal Education: "My Place by the Bay" — Prepared Environments for Early Science Learning	Mary Jo Sutton
0125750	Elementary, Secondary, and Informal Education: Huntington Conservatory for Botanical Science	Kitty Connolly
0125762	Elementary, Secondary, and Informal Education — Stardust: Our Search for Origins (A Travelling Exhibition)	Paul Dusenbery
0125765	Elementary, Secondary, and Informal Education: Thinking SMART	Brenda Stegall
0133662	CAREER: Shared Scientific Sense-Making and Bilingual Student Advancement in Science: Linking Family and School Learning Through Informal Learning Research	Doris Ash
0201155	NOVA Minutes	Eliene Augenbraun
0205843	Assessing the Impact of a Visit to a Zoo or Aquarium: A Multi-institutional Research Project	John Falk Cynthia Vernon

Award #	Title	Project Representatives
0205883	Explore It! Science Investigations in Out-of-School Programs	Bernard Zubrowski
0206184	Commercial Television News as a Vehicle for Enhancing Public Understanding of Research (PUR)	Eliene Augenbraun
0206382	Community Partnerships Serving Science	David Chittenden
0208470	The Human Condition: Knowledge and Values in the Age of Science	Bari Scott
0229063	Sea Floor Science	Harry Helling
0229219	The Writing Project	Suzanne Bauman
0229268	Connections: An Interactive Exhibition on Networking	Alan Friedman Eric Siegel
0229512	Seeing in the Dark	Timothy Ferris
0229595	LifeTrek	Paul Pearson
0229733	Sugar from the Sun	Thomas Antonio
0229812	Dragon Skies: Astronomy of Imperial China	Alexandra Hall
0229872	Round and Round	Jennifer Martin
0229918	Water is Life: Immersing the Public in Aquatic Diversity	Margaret Burke Terrence Gosliner
0307550	Mystery Solved: A Traveling Exhibit in Mathematics	Elizabeth Fleming
0307615	APPALACHIA: A History of Mountains and People	Ross Spears
0307709	Yellowstone Old Faithful Visitor Education Center	Sally Plumb
0307843	Understanding Race and Human Variation: A Public Education Program	Mary Overbey
0307862	Discoveries and Breakthroughs Inside Science: Science TV News That Matters	Alicia Torres
0307875	Traveling Exhibit on Technology, Imagination and the Future Using the Fantasy Technologies in the Star Wars Movies as Examples	Lawrence Bell
0307886	Da Niao and Big Bird Look at the Sky	Rosemarie Truglio

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0307925	Listening: Making Sense of the Sonic Soup	Tom Rockwell Kathleen McLean Sue Allen
0307927	Attention, Emotion and Judgement: How Do Minds Figure Out What to Do? An Exhibit Development Project at the Exploratorium	Tom Rockwell Kathleen McLean
0307939	Absolute Zero and the Conquest of Cold	Meredith Burch Richard Hudson
0322214	The Research Ambassador Program: Empowering Scientists to Communicate Research to Public Audiences	Nalini Nadkarni
0331438	Virtual Stowaway on an Oceanographic Cruise	Dan Smith
0337087	The World Around Us (WAU) — An Exhibition Project	Scott Alvey
0337090	The Gender Chip Project	Jean Donohue Fred Johnson
0337266	Community Ambassadors in Science Exploration (CASE)	Minda Borun
0337323	“ZOOM” — Season Seven	Kate Taylor
0337354	TexNET: Texas Network for Exhibit-based Learning and Teaching	Charlie Walter Sam Dean
0337389	Presenting Current Science and Research: A New Model for Exhibit Making	Liza Pryor
0406173	Project Butterfly WINGS: Winning Investigative Network for Great Science	Betty Dunckel
0406675	Mixing in Math: Transforming the Role of Math in After-School Programs	Marlene Kliman
0406911	After-School Program Exploring Science (APEX)	Judy Brown Cheryl Juarez
0407058	TEAMS III - Small Museum Exhibit Collaborative	David Goudy
0407101	Breaking the Maya Code	David Lebrun
0407140	Saving Madagascar through Applied Science	Sonal Bhatt Sara Hobel

Award #	Title	Project Representatives
0407280	Senior Environmental Experiences (SEE)	Angela Cristini
0407355	“How People Make Things” — A Traveling Exhibition	Penny Lodge
0407373	Biomusic: The Music of Nature	J Shipley Newlin Wendy Pollock
0407400	Everyone Counts! — ¡Todo el mundo cuenta!	Cheryl McCallum
0407414	Giant Planets: Exploring the Outer Solar System	Paul Dusenbery James Harold
0411826	Facilitating Group Scientific Inquiry Using Science Museum Exhibits	Sue Allen Kathleen McLean
0422545	Inquiring with GIS (I-GIS) Project: A Partnership Between Scientists and Educators	Cathlyn Styliniski
0426378	Too Small To See	Carl Batt
0436594	Riverwebs: Crossing Boundaries to Explore the Hidden Mysteries of Streams	Jeremy Monroe
0438834	After-School Math PLUS (ASM+)	Maryann Stimmer
0439049	Waves in Space	Philip Erickson
0439102	Conference & Proceedings: “Crafting and Evaluating Interactive Educational Websites,” Cornell Laboratory of Ornithology, Cornell University, Ithaca, New York, Spring, 2005	Rick Bonney
0441289	National Coalition for Science in Afterschool Conference Proposal	Elizabeth Stage
0445211	Documenting Floristic Diversity in a Threatened Biodiversity Hot Spot: San Diego County, California (Phase 1)	Mary Ann Hawke
0448883	Space Weather Outreach Program	Paul Dusenbery James Harold
0451933	Astronomy from the Ground Up: Building Capacity in Smaller Informal Science Education Institutions	Suzanne Gurton Wendy Pollock
0452128	How Do We Know What We Know? Resources for the Public Understanding of Scientific Evidence	Melissa Alexander
0452371	Nanotechnology: The Convergence of Science and Society	Cynthia Needham
0452417	Vanishing Voices	Daniel Miller Seth Kramer

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0452419	The Impact of Informal Science on Girls' Interest, Engagement and Participation in Science Communities, Hobbies and Careers: A Research and Dissemination Project	Dale McCreedy Lynn Dierking
0452485	ZOOM 8/Hot Spot	Kate Taylor
0452550	Partnership of Playful Learners	Tsivia Cohen Rick Garmon
0452567	Playful Invention and Exploration (PIE) Institute: Professional Development Opportunities for Informal Educators	Mike Petrich Sam Dean
0452611	The DNA Files III	Bari Scott
0455286	Out on a Limb — Forest Canopies	Margaret Lowman
0514746	What's the BIG Idea?: Science and Mathematics for Children in Your Public Library	Sally Anderson
0514808	Science and Math in Spanish-language Media	Jose Franco
0514981	Sea Monsters 3D: A Large-format Film and Outreach Program	Lisa Truitt Melissa Jordan
0515387	Yuungnaqpiallerput (The Way We Genuinely Live) Masterworks of Yup'ik Science and Survival	Suzi Jones
0515449	Research Video News: Catalyst for Increasing Engagement of General Audiences	Eliene Augenbraun
0515468	Successful Scaffolding Strategies in Urban Museums: Research and Practice on Mediated Scientific Conversations with Families and Museum Educators	Judith Lombana Doris Ash
0515470	Goosebumps! The Science Behind Feeling Scared	David Bibas
0515489	The Human Spark	Jared Lipworth
0515494	Fantasy Sports Games as Cultures for Informal Learning	Brian Smith
0515517	How Scientists Work	Jim Metzner
0515526	Design Squad: Season One	Marisa Wolsky
0515528	Windows on Earth	Daniel Barstow
0515549	Creating a National Infrastructure of Support for Extended Explorations in Science and Engineering in After-school Programs	Bernard Zubrowski
0515566	DragonflyTV's Science Center Showcase	Richard Hudson

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0515572	Teenage Designers of Learning Places for Children: Creating After-school Environments for STEM Education	Diane Miller
0515597	Children's Library Discovery Center (CLDC): 'Science in the Stacks'	Lorna Rudder-Kilkenny Tom Rockwell
0515599	Water Planet	Patrick Hamilton
0517906	ISE/PIs-Aging Network Partners Conference to be Convened in Washington, DC, in the Fall of 2005	Russell Morgan
0524799	SeaTech: Underserved Teens Hooked on Ocean Technology!	Harry Helling
0525040	Urban Ecology, Information Technology, and Inquiry Science for Students and Teachers	George Barnett Charles Lord
0529213	Building a Network Between Civil Engineers and Science Museums	Robert Reitherman
0532536	Nanoscale Informal Science Education Network	Lawrence Bell Carol Lynn Alpert Tom Rockwell
0540152	Life Changes	E. Margaret Evans Preeti Gupta
0540185	Project NestWatch	Rick Bonney Janis Dickinson
0540187	Great Lakes Coalition for Watershed Education: Listening to the River Project	Joe VanderMeulen
0540261	ExFiles: An Online Science Exhibit Community	Wendy Pollock Kathleen McLean
0540273	Peep and the Big Wide World (Season 3)	Kate Taylor Marisa Wolsky
0540300	Hispanic Science News Service	Robert Russell
0540306	Informal Learning and Science in Afterschool: A Research and Dissemination Project	Gil Noam Bronwyn Bevan
0540335	Crime, Science and Inquiry: An Integrated Exhibit and Web-based Learning Initiative	Charlie Walter
0540358	Model Master Naturalist Programs: A Minnesota/Florida Collaboration	Robert Blair Amy Rager
0540417	Communicating Ocean Sciences to Informal Audiences (COSIA)	Catherine Halversen

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0540418	Quest: Exploring our Natural World	SueEllen McCann
0545947	Learning Science within Informal Environments	Tom Keller
0610053	Acceso la Ciencia: Haciendo la Ciencia Accesible para los Padres y de los Ninos Latinos en Comunidades Rurales / Access Science: Making Science Accessible for Latino Parents	Michael Trevisan
0610122	Penguin Science	Jean Pennycook
0610195	Discovery Corps Postdoctoral Fellowship: Integrating Materials Chemistry and Art for Metallic Art Conservation	Tami Clare
0610253	Maya Skies: Research and Capacity-building in Fulldome Planetariums	Martin Storksdiack
0610270	Native Science Field Centers	Bonnie Sachatello-Sawyer
0610272	Science and Technology Program	Jacinda Abcarian
0610333	The NewsHour with Jim Lehrer Science Unit	Franmarie Kennedy Linda Winslow
0610345	Collaborative Research: The Trail of Time: A Geoscience Exhibition at Grand Canyon National Park	Karl Karlstrom
0610348	InformalScience.org: Building a Web Community for Informal Science	Kevin Crowley Marti Louw
0610350	Community Science Learning through Youth Astronomy Apprenticeships (YAA)	Irene Porro
0610352	Science Now, Science Everywhere	Wayne LaBar
0610363	Citizen Science: Development and Dissemination of a Model for Program Developers	Rick Bonney Janis Dickinson
0610393	Collaborative Research: The Trail of Time: A Geoscience Exhibition at Grand Canyon National Park	Karl Karlstrom Laura Crossey
0610406	FETCH With Ruff Ruffman, Season Two	Kate Taylor
0610409	Wild Research: A Whole-Zoo Exhibit and Inquiry Program	Christopher Myers
0610427	WolfQuest: Learning through Gameplay	Grant Spickelmier
0610436	Geometry Playground: An Immersive Learning Laboratory	Josh Gutwill
0628867	The Science Behind Climate Change: A Journey to Reedy Glacier	James Campbell

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0628879	Statistics for Action	Mary Jane Schmitt
0628938	The Fabric of the Cosmos — A Planning Grant	David Condon
0628988	Identifying a Framework for University-sponsored ISE — A Planning Grant	Nicole Timmons Stafford
0629191	Professional Development Framework for Informal Environmental Educators	Linda Rhoads
0632194	IPY: Pole to Pole	Moira Rankin
0632219	IPY: Collaborative Research: Live from the Poles; A Multimedia Educational Experience	Fritz Heide
0632262	POLAR-PALOOZA	Geoffrey Haines-Stiles
0636124	The Role of Media in Supporting Free-Choice Science Learning	Beverly Sheppard John Falk
0638793	MarshAccess	Jean Balutanski Angela Cristini
0638873	Sharing the Universe	Suzanne Gurton
0638891	Flight of the Butterflies	JoAnna Baldwin-Mallory
0638894	Radio Lab — A New Approach to Science Storytelling on Radio	Ellen Horne
0638909	Project WISE: Working in Informal Science Education	Gregory DiLisi
0638917	Roadside Heritage: Informal Science Education in the Eastern Sierra Nevada Byways	Paula Williams
0638962	Cyberchase Season 6: Get Active With Math!	Frances Nankin
0638963	The Black Hole Experiment Gallery: Testing the theories of gravity and of free-choice learning	Roy Gould
0638966	Citizen Science Laboratory at Hacienda La Esperanza Reserve	Lee Ann Rodriguez Luisa Rosado
0638970	TechXcite	Paul Klenk
0638977	Water's Journey through The Everglades	Eileen Smith
0638981	Informal Science Education Resource Center (ISERC)	Wendy Pollock John Falk Kevin Crowley Alan Friedman

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0638990	PPE (Preschoolers, Parents, and Educators: Strategies to Support Early Science Literacy)	Gail Ringel
0639021	Portal to the Public	Dennis Schatz
0646987	Bringing Research on Learning to Practitioners in Informal Science Environments	Tom Keller
0651544	SciGirls TV - Planning Grant	Richard Hudson
0652343	Dialect Loss and Innovation: Documentaries and Outreach Program	Walter Wolfram
0714241	STEPS - ScienceTheater Education Programming System: A Vehicle for Professional Development, Enhancing Professional Identity, and Communicating Science	James Harold Paul Dusenbery
0714537	Math off the Shelf	Marlene Kliman Martha Merson
0714629	Collaborative Research: Cosmic Serpent - Bridging Native and Western Science Learning in Informal Settings	Nancy Maryboy
0714633	Pulse Of The Planet's Children's Science Challenge	Jim Metzner
0714645	The Fabric of the Cosmos	David Condon
0714655	Terrascope Youth Radio	Ari Epstein
0714658	LEAP into Science: A National Museum/Library Partnership	Dale McCreedy
0714673	BRIDGES: Build, Research, Invent, Design, Grow & Explore through Science	Leonisa Ardizzone Kathryn Slocum
0714703	Using Informal Explorations of Living Phenomena to Enhance Science Learning	Bernard Zubrowski
0714706	A Participatory Model for Integrating Cognitive Research into Exhibits for Children	Marta Biarnes
0714741	FETCH! Future Scientists Initiative	Kate Taylor
0714744	Seasons of Change: Signs of Climate Change in New England and North Carolina	Richard Polonsky
0714762	A Youth-Directed Cafe Scientifique	Michelle Hall Michael Mayhew
0714779	BioArcade	Robert Hone
0715287	Understanding the Tree of Life	E. Margaret Evans

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0715380	"Indonesian Origins: Genes, Languages and Culture" video programs	A. Ashley Stinnett
0723829	Children's Learning from Multiple Media in Informal Mathematics Education	Frances Nankin
0725230	Discovery Corp Senior Fellowship	Carl Batt
0731703	Finding NEO: asteroids, lightcurves, and amateur astronomers	James Harold
0731984	Savage Yard	Bob Hirshon
0732142	Fusion Science Theater: An Innovative Model To Sow And Grow The Seeds Of Stem Through Community-Based Science Theater	Holly Walter Kerby
0732438	Encounters: Radio Experiences in the North	Richard Nelson
0732752	IPY: Polar Hydrobot Simulator	James Harold
0732835	IPY: Ice Planet Earth	Annette Schloss Carolyn Sumners
0732879	International POLAR-PALOOZA - Emphasizing the "I" in IPY & Enabling Global Conversations on the Antarctic Treaty	Geoffrey Haines-Stiles
0732955	IPY: Improving the Public's Understanding of Polar Research Through Hands-On Fellowships for Science Journalists in the Arctic and Antarctic	Christopher Neill
0733048	Ice Stories: A Public Educational Resource for IPY	Mary Miller
0734285	Moving Mountains: An education-outreach video for the Geosciences	Vivian Trakinski
0734835	Conference on Museums and New Family Audiences—Building Relationships	Minda Borun
0735431	U.S.- China Science Popularization Forum	Walter Staveloz
0738033	Interactions in Understanding the Universe (I2U2)	Mark SubbaRao
0739874	Making Natural Connections: An Authentic Field Research Collaboration	Susan Flowers
0741685	The City as Learning Lab: Spreading Technological Fluency Through Creative Robotics	Kevin Crowley Marti Louw
0741746	3rd Rock Reality	Stephen Curwood

PARTICIPANTS

Jacinda Abcarian

Youth Radio
jacinda@youthradio.org
0610272

Jennifer Adams

CAISE Fellow
Brooklyn College - CUNY
JAdams@brooklyn.cuny.edu

Melissa Alexander

Exploratorium
melissaa@exploratorium.edu
0452128

Sue Allen

Exploratorium
suea@exploratorium.edu
0307925, 0411826

Carol Lynn Alpert

Museum of Science, Boston
calpert@mos.org
0532536

Scott Alvey

Louisville Science Center
scott.alvey@louisvilleky.gov
0337087

Sally Anderson

CAISE Leadership & Diversity Task Force
Vermont Center for the Book
salander@vermontbook.org
0514746

Greg Andorfer

Stardust Blue
gpandorfer@yahoo.com
09909405

Thomas Antonio

College of Santa Fe
tantonio@csf.edu
0229733

Leonisa Ardizzone

Salvadori Center
ardizzone@salvadori.org
0714673

Doris Ash

University of California-Santa Cruz
dash5@ucsc.edu
0133662, 0515468

Eliene Augenbraun

ScienCentral Incorporated
ea@sciencentral.com
0201155, 0206184, 0515449

Beatriz Azor

Cost Analysis and Audit Resolution Branch
Office of Budget, Finance, and Award
Management
National Science Foundation
bazor@nsf.gov

John Baek

CAISE Manager
Center for Advancement of Informal Science
Education
jbaek@caise.insci.org

JoAnna Baldwin-Mallory

Filmmakers Collaborative, Inc.
jbaldwinmallory@partners.org
0638891

Jean Balutanski

Ramapo College of New Jersey
jbalutan@ramapo.edu
0638793

George Barnett

Boston College
barnetge@bc.edu
0525040

Daniel Barstow

TERC, Inc.
Dan_Barstow@terc.edu
0515528

Carl Batt

Cornell University
cab10@cornell.edu
0426378, 0725230

Suzanne Bauman

Ways of Knowing, Inc.
filmforthought@aol.com
0229219

Lawrence Bell

CAISE Inquiry Group Leader
Museum of Science, Boston
lbell@mos.org
0307875, 0532536

Bronwyn Bevan

CAISE Inquiry Group Leader
Exploratorium
bronwynb@exploratorium.edu
0119787, 0443196, 0540306

Sonal Bhatt

Wildlife Conservation Society
sbhatt@wcs.org
0407140

Marta Biarnes

Museum of Science, Boston
mbiarnes@mos.org
0714706

David Bibas

California Science Center
dbibas@cscmail.org
0515470

Mamie Bittner

Policy, Planning, Research, and
Communications
Institute of Museum and Library Services
mbittner@imls.gov
0540358

Robert Blair

University of Minnesota-Twin Cities
blairrb@umn.edu

Rick Bonney

CAISE Inquiry Group Leader
Cornell University
reb5@cornell.edu
0125633, 0439102, 0540185, 0610363

Tina Bordonaro

National Center for Research Resources
National Institutes of Health
ThomasTi@od.nih.gov

Jennifer Borse

Rockman et al
jennifer@rockman.com

Minda Borun

Franklin Institute Science Museum
mindaborun@gmail.com
0337266, 0734835

Judy Brown

Miami Museum of Science, Inc.
jabrown@miamisci.org
0406911

Meredith Burch

Meridian Productions
merburch@earthlink.net
0307939

Margaret Burke

California Academy of Sciences
mburke@calacademy.org
0229918

James Campbell

Modular Media
modmedia1@earthlink.net
0628867

PARTICIPANTS

Becky Carroll

CAISE Evaluator
Inverness Research, Inc.
bcarroll@inverness-research.org

Pam Castori

CAISE Evaluator
Inverness Research, Inc.
pcastori@inverness-research.org

David Chittenden

Science Museum of Minnesota
davec@smm.org
0206382

Tami Clare

Philadelphia Museum of Art
tclare@philamuseum.org
0610195

Tsivia Cohen

Chicago Children's Museum
tsiviac@chicagochildrensmuseum.org
0452550

David Condon

WGBH Educational Foundation
david_condon@wgbh.org
09901978, 0628938, 0714645

Kitty Connolly

Huntington Library, Art Collections, and
Botanical Gardens
kconnolly@huntington.org
0125750

Angela Cristini

Ramapo College of New Jersey
acristin@ramapo.edu
0407280, 0638793

Laura Crossey

University of New Mexico
lcrossey@unm.edu
0610393

Kevin Crowley

CAISE Co-Principal Investigator
University of Pittsburgh Center for Learning
in Out of School Environments
crowleyk@pitt.edu
0125652, 0610348, 0638981, 0741685

Stephen Curwood

World Media Foundation
scurwood@post.harvard.edu
0741746

Wendy Davis

Servicewide Education Program
National Park Service
wyndeth_davis@nps.gov

Arlene de Strulle

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
adestrul@nsf.gov

Sam Dean

Exploratorium
sdean@exploratorium.edu
0337354, 0452567

Al DeSena

Coordinator, Lifelong Learning Cluster
Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
adesena@nsf.gov

Ilana Diamant

University of Pittsburgh
eid3@pitt.edu

Janis Dickinson

Cornell University
jld84@cornell.edu
0540185, 0610363

Lynn Dierking

CAISE Senior Researcher
Oregon State University
dierkin@science.oregonstate.edu
0452419

Gregory DiLisi

John Carroll University
gdilisi@jcu.edu
0638909

Jean Donohue

Media Working Group
jdonohue@mwg.org
0337090

Mary Downs

Policy, Planning, Research, and
Communications
Institute of Museum and Library Services
mdowns@imls.gov

Betty Dunckel

University of Florida
bdunckel@flmnh.ufl.edu
0406173

Paul Dusenbery

Space Science Institute
dusenbery@spacescience.org
0125762, 0407414, 0448883, 0714241

Ari Epstein

Massachusetts Institute of Technology
awe@alum.mit.edu
0714655

Philip Erickson

Massachusetts Institute of Technology
pje@haystack.mit.edu
0439049

E. Margaret Evans

University of Michigan
evansem@umich.edu
0540152, 0715287

John Falk

CAISE Co-Principal Investigator
Oregon State University
falkj@science.oregonstate.edu
0205843, 0636124, 0638981

Joan Ferrini-Mundy

Division Director
Research on Learning in Formal and
Informal Settings
National Science Foundation
jferrini@nsf.gov

Timothy Ferris

ClockDrive Productions
tf@timothyferris.com
0229512

Elizabeth Fleming

Museum of Life + Science
elizabeth.fleming@ncmls.org
0307550

Susan Flowers

Washington University
flowers@wustl.edu
0739874

Michael Fragale

Educational Programming
Corporation for Public Broadcasting
mfragale@cpb.org

Jose Franco

University of California-Berkeley
jfranco@berkeley.edu
0514808

Alan Friedman

CAISE Co-Principal Investigator
Visitor Studies Association
AlanFriedman@verizon.net
0229268, 0638981

Bruce Fuchs

Office of Science Education
National Institutes of Health
FuchsB@mail.nih.gov

Sarah Garlick

CAISE Fellow
Geoscience Outreach
sarah@geoscienceoutreach.org

Rick Garmon

Chicago Children's Museum
rickg@chicagochildrensmuseum.org
0452550

Yolanda George

CAISE Steering Committee
American Association for the Advancement
of Science
ygeorge@aaas.org

Ellen Giusti

Independent Consultant
egiusti@nyc.rr.com

Irene Goodman

Goodman Research Group, Inc.
Goodman@grginc.com

Terrence Gosliner

California Academy of Sciences
tgosliner@calacademy.org
0229918

David Goudy

Montshire Museum of Science
david.goudy@montshire.org
0407058

Roy Gould

Smithsonian Institution Astrophysical
Observatory
rgould@cfa.harvard.edu
0638963

Kantave Greene

CAISE Fellow
Jackson State University
kantave.m.greene@jsums.edu

Preeti Gupta

CAISE Steering Committee
CAISE Leadership & Diversity Task Force
New York Hall of Science
pgupta@nyscience.org
0540152

Suzanne Gurton

Astronomical Society of the Pacific
sgurton@astrosociety.org
0451933, 0638873

Josh Gutwill

Exploratorium
joshuag@exploratorium.edu
0610436

Geoffrey Haines-Stiles

Geoff Haines-Stiles Productions
ghs@passporttoknowledge.com
0632262, 0732879

Michelle Hall

Science Education Solutions, Inc.
hall@scieds.com
0714762

Catherine Halversen

University of California-Berkeley
chalver@berkeley.edu
0540417

Patrick Hamilton

Science Museum of Minnesota
phamilton@smm.org
0515599

Wendy Hancock

Association of Science-Technology Centers
whancock@astc.org

David Hanych

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
dhanych@nsf.gov

James Harold

Space Science Institute
harold@spacescience.org
0407414, 0448883, 0714241, 0731703,
0732752

Mary Ann Hawke

San Diego Natural History Museum
mhawke@sdnhm.org
0445211

Pam Hawkins

Division of Grants and Agreements
Office of Budget, Finance, and Award
Management
National Science Foundation
pahawkin@nsf.gov

Fritz Heide

Woods Hole Oceanographic Institution
clinder@whoi.edu
0632219

Harry Helling

CAISE Steering Committee
Ocean Institute
hhelling@ocean-institute.org
0229063, 0524799

Bob Hirshon

American Association for the Advancement
of Science
bhirshon@aaas.org
0731984

Sara Hobel

Wildlife Conservation Society
shobel@wcs.org
0407140

Robert Hone

Red Hill Studios
bobh@redhillstudios.com
0104732, 0714779

Ellen Horne

New York Public Radio - WNYC
ehorne@wnyc.org
0638894

Richard Hudson

CAISE Steering Committee
Twin Cities Public Television
rhudson@tpt.org
0104732, 0307939, 0515566, 0651544

Sylvia James

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
sjames@nsf.gov

Wyn Jennings

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
pjennings@nsf.gov

Tarsha Johnson

Division of Grants and Agreements
Office of Budget, Finance, and Award
Management
National Science Foundation
tjohnson@nsf.gov

Fred Johnson

Media Working Group
fjohnson@mwg.org
0337090

Suzi Jones

Anchorage Museum Association
jonesjs@anchagemuseum.org
0515387

Melissa Jordan

National Geographic Television
mjordan@ngs.org
0514981

PARTICIPANTS

Cheryl Juarez

Miami Museum of Science, Inc.
cheryl@miamisci.org
0406911

Karl Karlstrom

University of New Mexico
kek1@unm.edu
0610345, 0610393

Valentine Kass

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
vkass@nsf.gov

Tom Keller

National Academy of Sciences
tkeller@nas.edu
0545947, 0646987

Franmarie Kennedy

MacNeil/Lehrer Productions
fkennedy@newshour.org
0610333

Holly Walter Kerby

Madison Area Technical College
hkerby@matcmadison.edu
0732142

Maureen Kerr

Education Division
National Air and Space Museum
Maureen.Kerr@nasm.si.edu

Ka'iu Kimura

CAISE Fellow
'Imiloa Astronomy Center
University of Hawai'i at Hilo
kkimura@imiloahawaii.org

Paul Klenk

Duke University
pak@duke.edu
0638970

Marlene Kliman

TERC, Inc.
marlene_kliman@terc.edu
0406675, 0714537

Louisa Koch

Office of Education
National Oceanic and Atmospheric
Administration
Louisa.Koch@noaa.gov

Mary Koppal

American Association for the Advancement
of Science
mkoppal@aaas.org
0103678

Seth Kramer

Ironbound Films, Inc.
kramer@ironboundfilms.com
0452417

Wayne LaBar

Liberty Science Center, Inc.
wlabar@lsc.org
0610352

Katherine Law

CAISE Fellow
Our Lady of Holy Cross College
klaw@ohlcc.edu

David Lebrun

Night Fire Films
lebrun@ix.netcom.com
0407101

Bruce Lewenstein

CAISE Steering Committee
Cornell University
b.lewenstein@cornell.edu

Jared Lipworth

Thirteen/WNET New York
lipworth@thirteen.org
0515489

Penny Lodge

The Pittsburgh Children's Museum
plodge@pittsburghkids.org
0407355

Judith Lombana

Museum of Science and Industry, Tampa
judithL@mosi.org
0515468

Blyth Lord

WGBH Educational Foundation
blyth_lord@wgbh.org

Charles Lord

Boston College
lordca@bc.edu
0525040

Marti Louw

CAISE Inquiry Group Leader
University of Pittsburgh Center for Learning
in Out of School Environments
martil@pitt.edu
0610348, 0741685

Margaret Lowman

New College of Florida
lowman@ncf.edu
0455286

Cora Marrett

Assistant Director
Directorate for Education & Human
Resources
National Science Foundation
cmarrett@nsf.gov

Sherry Marshall

CAISE Fellow
Science Museum Oklahoma
SMarshall@sciencemuseumok.org

Daphne Marshall

Senior Program Assistant
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
dmarshall@nsf.gov

Sandra Martell

CAISE Fellow
University of Wisconsin-Madison
smartell@uwm.edu

Jennifer Martin

Children's Discovery Museum of San Jose
jmartin@cdm.org
0229872

Nancy Maryboy

Indigenous Education Institute
ncm@indigenouseducation.org
0714629

Michael Mayhew

Science Education Solutions, Inc.
michael.mayhew@comcast.net
0714762

Ellen McCallie

CAISE Director
Center for Advancement of Informal Science
Education
emccallie@caise.insci.org

Cheryl McCallum

The Children's Museum of Houston
cmccallum@cmhouston.org
0407400

SueEllen McCann

KQED, Inc.
smccann@kqed.org
0540418

Dale McCreedy

Franklin Institute Science Museum
mccreedy@fi.edu
0000636, 0452419, 0714658

Kathleen McLean

Independent Exhibitions
kmclean@ind-x.org
0307925, 0307927, 0411826, 0540261

Martha Merson

TERC, Inc.
martha_merson@terc.edu
0714537

Jim Metzner

Jim Metzner Productions, Inc.
pulse@igc.org
0515517, 0714633

Samantha Meyer

George Mason University
smeyer3@gmu.edu

Christos Michalopoulos

Office of Education
National Oceanic and Atmospheric
Administration
Christos.Michalopoulos@noaa.gov

Mary Miller

Exploratorium
marym@exploratorium.edu
0733048

Diane Miller

CAISE Leadership & Diversity Task Force
St Louis Science Center
dmiller@slsc.org
0515572

Daniel Miller

Ironbound Films, Inc.
miller@ironboundfilms.com
0452417

Amy Miller

Friends of the National Zoo
millera@si.edu

Phyllis Minn

Senior Program Assistant
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
pminn@nsf.gov

Jeremy Monroe

Colorado State University
jeremy@freshwatersillustrated.org
0436594

Russell Morgan

SPRY Foundation
morganr@spry.org
0517906

Christopher Myers

Miami University
myersca@muohio.edu
0610409

Nalini Nadkarni

Evergreen State College
nadkarnn@evergreen.edu
0322214

Sarita Nair-Pillai

ITEST Learning Resource Center
spillai@edc.org

Frances Nankin

Thirteen/WNET
Nankin@thirteen.org
0638962, 0723829

Cynthia Needham

Oregon Public Broadcasting
cynthia@smartscience.org
0452371

Christopher Neill

Marine Biological Laboratory
cneill@mbl.edu
0732955

Richard Nelson

KCAW-FM Raven Radio
sitkasound@gmail.com
0732438

Trevor Nesbit

CAISE Fellow
ECHO Lake Aquarium and Science Center at
the Leahy Center for Lake Champlain
tnesbit@echovermont.org

J. Newlin

Science Museum of Minnesota
newlin@smm.org
0407373

Gil Noam

McLean Hospital
gnoam@mclean.harvard.edu
0540306

Terrie Nolinke

TNI Consultants LLC
tni@tniconsultants.com

Stephanie Norby

Smithsonian Center for Education and
Museum Studies
snorby@si.edu

Carol Orlando

Cost Analysis and Audit Resolution Branch
Office of Budget, Finance, and Award
Management
National Science Foundation
corlando@nsf.gov

Mary Overbey

American Anthropological Association
Peggy.Overbey@gmail.com
0307843

Paul Pearson

Brooklyn Children's Museum
ppearson@brooklynkids.org
0229595

Jean Pennycook

H.T. Harvey & Associates
jean.pennycook@fresnounified.org
0610122

Mike Petrich

Exploratorium
mpetrich@exploratorium.edu
0452567

Molly Phipps

Oregon State University
phippsm@science.oregonstate.edu

Sally Plumb

Yellowstone National Park
sally_plumb@nps.gov
0307709

Wendy Pollock

CAISE Principal Investigator
Association of Science-Technology Centers
wpollock@astc.org
0407373, 0451933, 0540261, 0638981

Richard Polonsky

Brown University
richard_polonsky@brown.edu
0714744

Irene Porro

Massachusetts Institute of Technology
iporro@space.mit.edu
0610350

Liza Pryor

Science Museum of Minnesota
lpryor@smm.org
0337389

Amy Rager

University of Minnesota-Twin Cities
rager001@umn.edu
0540358

PARTICIPANTS

Scott Randol

CAISE Senior Researcher
Oregon State University
srandol@berkeley.edu

Moira Rankin

Soundprint Media Center, Inc.
moira@soundprint.org
0632194

Christine Reich

CAISE Inquiry Group Leader
Museum of Science, Boston
creich@mos.org

Robert Reitherman

Consortium of Universities for Research in
Earthquake Engineering
reitherman@curee.org
0529213

Linda Rhoads

Environmental Education Association of
Oregon
lindar@eeao.org
0629191

Bronwen Rice

National Oceanic and Atmospheric
Administration
Bronwen.Rice@noaa.gov

Gail Ringel

Boston Children's Museum
Ringel@BostonChildrensMuseum.org
0638990

Saul Rockman

Rockman et al
saul@rockman.com

Tom Rockwell

Exploratorium
trockwell@exploratorium.edu
0104478, 0307925, 0307927, 0515597,
0532536

Lee Ann Rodriguez

The Conservation Trust of Puerto Rico
rodriguezl@Fideicomiso.org
0638966

Luisa Rosado

The Conservation Trust of Puerto Rico
baezj@Fideicomiso.org
0638966

Ellen Rubin

CAISE Inquiry Group Leader
Consultant
ellenr5@verizon.net

Lorna Rudder-Kilkenny

Queens Borough Public Library
lrudder@queenslibrary.org
0515597

Christine Ruffo

Association of Science-Technology Centers
cruffo@astc.org

Robert Russell

Self Reliance Foundation
bob.russell@srfdc.org
0540300

Bonnie Sachatello-Sawyer

Hopa Mountain, Inc.
bsawyer@hopamountain.org
0610270

Dennis Schatz

Pacific Science Center
schatz@pacsci.org
0639021

Annette Schloss

University of New Hampshire
annette.schloss@unh.edu
0732835

Mary Jane Schmitt

TERC, Inc.
mary_jane_schmitt@terc.edu
0628879

Bari Scott

SoundVision Productions
bariscot@aol.com
0208470, 0452611

Marsha Semmel

Museum Services
Strategic Partnerships
Institute of Museum and Library Services
msemmel@imls.gov

Beverly Serrell

Serrell and Associates
bserrell@aol.com

Orrin Shane

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
oshane@nsf.gov

Beverly Sheppard

Institute for Learning Innovation, Inc.
sheppard@ilinet.org
0636124

Hi'ilani Shibata

CAISE Fellow
Bishop Museum
hshibata@bishopmuseum.org

Eric Siegel

New York Hall of Science
esiegel@nyscience.org
0229268

Gary Silverstein

Westat
silverg1@westat.com

Mary Sladek

Informal Education
National Aeronautics & Space Administration
Mary.F.Sladek@nasa.gov

Kathryn Slocum

Salvadori Center
kathryn@salvadori.org
0714673

Monica Smith

National Museum of American History
Smithsonian Institution
smithmo@si.edu
0125417

Brian Smith

Pennsylvania State University, University
Park
bsmith@ist.psu.edu
0331438

Dan Smith

Woods Hole Oceanographic Institution
dwsmith@whoi.edu
0515494

Eileen Smith

University of Central Florida
esmith@ist.ucf.edu
0638977

Christina Soontornvat

CAISE Fellow
Austin Children's Museum
csoontornvat@austinkids.org

Ross Spears

James Agee Film Project
rspears@cstone.net
0307615

Grant Spickelmier

Minnesota Zoo
grant.spickelmier@state.mn.us
0610427

Mark St. John

CAISE Evaluator
Inverness Research, Inc.
Mstjohn@inverness-research.org

Nicole Timmons Stafford

Colorado State University
ntimmons@cnr.colostate.edu
0628988

Elizabeth Stage

University of California-Berkeley
stage@berkeley.edu
0441289

Walter Staveloz

Association of Science-Technology Centers
wstaveloz@astc.org
0735431

Auntaneshia Staveloz

George Washington University
agarry74@hotmail.com

Brenda Stegall

Girls Incorporated
bstegall@girls-inc.org
0125765

Mary Ann Steiner

University of Pittsburgh Center for Learning
in Out of School Environments
mhs19@pitt.edu

Maryann Stimmer

Academy for Educational Development
mstimmer@aed.org
0438834

A. Ashley Stinnett

University of Arizona
astinnet@email.arizona.edu
0715380

Martin Storksdieck

Institute for Learning Innovation, Inc.
storksdieck@ilinet.org
0610253, 0638873, 0639021

Cathlyn Stylinski

University of Maryland Center for
Environmental Sciences
cat@al.umces.edu
0422545

Mark SubbaRao

Adler Planetarium and Astronomy Museum
msubbarao@adlerplanetarium.org
0738033

Carolyn Sumners

Houston Museum of Natural Science
csumners@hmns.org
0732835

Larry Suter

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
lsuter@nsf.gov

Mary Jo Sutton

Bay Area Discovery Museum
msutton@badm.org
0125740

Kate Taylor

WGBH Educational Foundation
kate_taylor@wgbh.org
0104700, 0337323, 0452485, 0540273,
0610406, 0714741

Alicia Torres

American Institute of Physics
atorres@aip.org
0307862

Vivian Trakinski

American Museum of Natural History
vivian@amnh.org
0734285

Michael Trevisan

Washington State University
trevisan@wsu.edu
0610053

Rosemarie Truglio

Sesame Workshop
rosemarie.truglio@sesameworkshop.org
0307886

Lisa Truitt

National Geographic Television
ltruitt@ngs.org
0514981

David Ucko

Deputy Division Director
Research on Learning in Formal and
Informal Settings
National Science Foundation
ducko@nsf.gov

Barry Van Deman

CAISE Steering Committee
Museum of Life + Science
barry.vandeman@ncmls.org

Joe VanderMeulen

Land Information Access Association
jvander@liaa.org
0540187

Bonnie VanDorn

Association of Science-Technology Centers
bvandorn@astc.org

Cynthia Vernon

CAISE Steering Committee
Monterey Bay Aquarium
cvernon@mbayaq.org
0205843

Ellen Wahl

CAISE Steering Committee
Ellen Wahl Consulting
ellen@ellenwahl.com

Charlie Walter

Fort Worth Museum of Science and History
cwalter@fwmslh.org
0337354, 0540335

Bill Watson

National Museum of Natural History
Smithsonian Institution
WatsonB@si.edu

Sandy Welch

Program Director
Informal Science Education Program
Research on Learning in Formal and
Informal Settings
National Science Foundation
swelch@nsf.gov

John Wells

Westat
JohnWells@westat.com

Wendy Wheeler

CAISE Steering Committee
CAISE Leadership & Diversity Task Force
Innovation Center for Community & Youth
Development
wwheeler@theinnovationcenter.org

Cynthia Musick White

Office of Workforce Development
Department of Energy
Cynthia.White@science.doe.gov

Paula Williams

Eastern Sierra Institute for Collaborative
Education
paula@esice.org
0638917

Linda Winslow

MacNeil/Lehrer Productions
lwinslow@newshour.org
0610333

Walter Wolfram

North Carolina State University
walt_wolfram@ncsu.edu
0652343

Marisa Wolsky

WGBH Educational Foundation
marisa_wolsky@wgbh.org
0515526, 0540273

Bernard Zubrowski

Education Development Center
bzubrowski@edc.org
0205883, 0515549, 0714703



center for advancement of
informal science education

Founded in 2007 with support from the National Science Foundation (NSF), CAISE is devoted to advancing and improving informal science education (ISE) in its many and varied forms—among them film and broadcast media, science centers and museums, zoos and aquariums, botanical gardens and nature centers, digital media and gaming, science writing, and youth, community, and after-school programs. CAISE studies issues and trends in informal science education, documents the impact and value of ISE, offers professional development opportunities for those working with and seeking NSF support, and provides a collective voice for the field.



CAISE Staff

Ellen McCallie
Director
202-783-7200 x137
emccallie@caise.insci.org

John Baek
Manager
202-783-7200 x139
jbaek@caise.insci.org

CAISE PI

Wendy Pollock
Association of Science-Technology Centers (ASTC)
Washington, DC



CAISE Co-PIs

John Falk
Oregon State University
Corvallis, OR



Kevin Crowley
University of Pittsburgh Center for
Learning in Out-of-School Environments
(UPCLOSE)
Pittsburgh, PA



Alan Friedman
Visitor Studies Association (VSA)
Columbus, OH



Steering Committee

Julie I. Johnson
Co-Chair
Science Museum of Minnesota
St. Paul, MN

Barry A. Van Deman
Co-Chair
Museum of Life and Science
Durham, NC

Preeti Gupta
Chair of Leadership & Diversity Task Force
New York Hall of Science
New York, NY

Diane Carlson
Giant Screen Cinema Association
Pacific Science Center
Seattle, WA

Tinsley Davis
National Association of Science Writers
Hedgesville, WV

James Gee
Arizona State University
Phoenix, AZ

Yolanda George
American Association for the
Advancement of Science (AAAS)
Washington, DC

Harry Helling
Ocean Institute
Dana Point, CA

Richard Hudson
Twin Cities Public Television
St. Paul, MN

Bruce Lewenstein
Cornell University
Ithaca, NY

Leona Schauble
Vanderbilt University
Nashville, TN

Cynthia Vernon
Monterey Bay Aquarium
Monterey, CA

Ellen Wahl
Ellen Wahl Consulting
New York, NY

Wendy Wheeler
Innovation Center for Community
and Youth Development
Takoma Park, MD

