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Key Areas of Need + Action Items

Dyad Presentations:

Rating Key

★ = participants proposed as an innovative action item

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Key Areas of Need: Designing and Evaluating Education and Outreach Programs at Centers and Large Facilities

Dyad presenters:

Monya Ruffin
Senior Scientist and Director of Education, Outreach and Diversity
Center for Selective C-H Functionalization, Emory University

William Katzman
Program Leader, Sceince Education Center
Laser Interferometer Graviational-Wave Observatory (LIGO)

Rating Key
★ = participants proposed as an innovative action item
✓ = participants proposed as a priority action item

***Key Areas of Need**: Designing and Evaluating Education & Outreach Programs at Centers and Large Facilities.*

Finding a place for education and outreach resources to "live", judging the extent to which these should be centralized, and raising awareness of their existence.

Action Item	Who?	Rating
Host a website (Wiki? portal?) where Education/Outreach, Broader Impacts (BI), Diversity resources are located • Resources include curriculum, activities, program models etc. that are available for download • Rating system → users/community comment and review resources → "Yelp" like system; crowdsourcing • Validates existing materials/models that are of high quality	CAISE	★✓✓
Centralized NSF hub for Education and Public Outreach (EPO) materials funded/created		✓✓
Infrastructure network (stewardship of the nation's investment)	NSF	
Model of successful programs (afterschool, K-6 programming, UG projects, weekend clubs family fairs, etc.). Not JUST curriculum.		

Rating Key

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***Key Areas of Need**: Designing and Evaluating Education & Outreach Programs at Centers and Large Facilities.*

Connecting with others who do outreach at any scale (in your region, related Centers/Facilities, etc.).

Action Item	Who?	Rating
University-based network for outreach professionals from IHEs and ISEs	e.g. UW Madison Science Alliance	✓✓
Building understanding among EPOs of science communication, informal science learning, evaluation; focused workshop, conference proposal, webinars?	National Alliance for Broader Impacts (NABI), AAAS, CAISE, ASBMB	✓
Interactive geographic organizational map, layers of information/filters (by an organization/program?)	NABI (supplement)	✓
R-E-S-P-E-C-T—treat EPO/Informal Science Education (ISE)/ Public Engagement with Science (PES) as an expertise (ex. A co-appointment in department of education and science)		
Connect with state STEM authority, STEM Coalitions, and other partners	Individuals must initiate	
Shift culture among EPO directors to be a community of practice and commit to this		

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***Key Areas of Need**: Designing and Evaluating Education & Outreach Programs at Centers and Large Facilities.*

Defining the mission of education/outreach/Broader Impacts programs, and figuring out how to evaluate them.

Action Item	Who?	Rating
Align expectations of NSF program officer, proposer and reviewers relative to broader impacts; seminars at NSF by program	CAISE/NABI/group of E&O Directors	★✓✓
Make this (defining the mission) part of BI RFP		
Broadening participation—"best practices" with ISE programs		
Award for EPO excellence	NABI? CAISE? Grassroots by EPOs?	
Develop common indicators for BI for science/engineering centers	NSF convene Center/Network evaluators, science/engineering Center directors	

Rating Key

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***Key Areas of Need**: Designing and Evaluating Education & Outreach Programs at Centers and Large Facilities.*

Sustaining programs after Center/Large Facility funding expires.

Action Item	Who?	Rating
Create position at NSF. The goal of this position would be to help Centers work towards sustainability	NSF (does it have to be NSF?)	★★★
Charge an individual or group at NSF with maintain oversight of "twilighting" centers, as well as extant Centers that might represent future homes for the soon-to-be orphaned programs, and facilitating connections between/among these centers.	NSF	★
Develop a list of past successful strategies for sustaining programs after funding expires	NABI or CAISE	✓✓✓
"Orphan" database of contacts of existing programs/projects that are interested in new collaborations/moving forward		✓✓
Change the mindset about what happens to programs after funding ends		✓
Create case studies/suggestions for ways to sustain E+O/BI programs after funding/Center sunsets.	CAISE	
State science foundations e.g. State Foundation of Arizona		
Using front-end evaluation to develop/create greater sustainability and strategic directions within a Center	Center/Large Facility leadership	
Maintain an NSF database of sustainability efforts that worked (e.g. Jory Weintraub transitioning from running outreach at NESCent to same programs at BEACON, another NSF-funded Center)		

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Key Areas of Need: Working with Informal Science Education Organizations and Networks

Dyad presenters:

Carol Lynn Alpert
Director, Strategic Partnerships, Museum of Science Boston
Co-Director, Center for Integrated Quantum Materials

Dennis Schatz
Senior Advisor
Pacific Science Center

Rating Key
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Key Areas of Need: *Working with Informal Science Education Organizations and Networks.*

Sustaining products, intellectual property, and institutional histories as ISE networks sunset.

Action Item	Who?	Rating
Database creation of curriculum, activities, lesson plans, etc. (especially of those that have been evaluated and impactful)	CAISE? NABI?	✓✓
Create position at NSF with the goal of helping Centers work toward sustainability		✓
Job search assistance for CAISE staff when the funding runs out!		✓
RFP strong language: what long0lasting products beyond life of grant?	NSF	✓
InformalScience.org = another home for resources		
Trellis will have home for resources (look for $ to sustain it after project ends)		
Identify models of past success	CAISE? COSEE?	
Is there a teachengineering.org that goes beyond the "E" in STEM? To post other Center curricula?	CAISE/NABI	

Rating Key

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Key Areas of Need: *Working with Informal Science Education Organizations and Networks.*

Developing a "network of networks" to leverage resources and connections.

Action Item	Who?	Rating
Establish a platform to host communication across networks and establish a small group of curators stimulate and manage communication → include NABI, STCs, CCIs, NSF contacts, NIH, COSEE, etc.?	Trellis?	✓
Trellis group for EPOs		
Encourage NABI + CAISE folks to join AAAS and sign up for Section Y (where most people who do science communication and ISE are members)		

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Key Areas of Need: *Working with Informal Science Education Organizations and Networks.*

Developing connections between PIs/researchers and ISE programs as proposals are developed.

Action Item	Who?	Rating
Manual for PIs and POs on how to develop and evaluate effective BI efforts + PD after to implement it.		✓✓✓✓
One-stop portal to link people, searchable by geographic area, etc. (Google Map-based—zoom into resources listed by filters)	NABI?	✓✓
National or regional match-maker service for scientists/centers and ISIs.		✓
Could ISE institutions/organizations develop structures and procedures that would enable IHE broader impacts professionals to connect with them more efficiently?		✓
Connections between PIs/ISE programs → raise awareness of EPOs to resources for these connections.	CAISE, Trellis/AAAS, NABI	

Rating Key

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Key Areas of Need: *Working with Informal Science Education Organizations and Networks.*

Sustaining programs as people move on.

Action Item	Who?	Rating
Create a position at NSF whose goal would be to help Centers work toward Sustainability		★
Study of transitions of NSF funds for Centers—how did they (or not) sustain, should they, what are the models and how do we make decisions about sustainability (should this be #1, less personnel-based, more funding based)	Organizational/social scientists	✓✓
Use Trellis!	Everyone	
Education and outreach sustainability plans for Large Facilities and Centers—how to continue the good stuff and grant mapping	Sunseted Centers who were successful	

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Key Areas of Need: Current and Past Productive Areas of Informal Science Education Research and Evaluation

Dyad presenters:

John Falk
Sea Grant Professor of Free-Choice Learning
Oregon State University

Karen Peterman
President
Karen Peterman Consulting Co.

Rating Key
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✓ = participants proposed as a priority action item

Key Areas of Need: *Current and Past Productive Areas of Informal Science Education Research and Evaluation.*

Supporting NSF program officers and panel reviewers by providing guidelines to review Broader Impacts portions of proposals.

Action Item	Who?	Rating
CAISE create an inventory of individuals that can serve as "ISE" panel reviewers → make information available to NSF. Recommendation: ISE reviewers participate in all proposals with Broader Impacts. Have "seat at the table" for BI as with Intellectual Merit. ISE representative be current on TEM, E/O, BI research and resources.	CAISE	★★★✓✓
Line item requirement in the budget for BI work		★✓✓
Provide additional info on Broader Impact criteria evaluation to all NSF reviewers	NABI	✓✓
Write a 1 or 2 page set of guidelines for Program Officers/panelists on how to evaluate proposals' broader impacts.	NABI	✓✓
Involving more BI/ISE professionals in panel reviews by NSF	NABI	✓✓
Panel review guidelines for BI reviews/evaluation		✓✓
Create a How To document for scientists to use as they review Broader Impacts of ISE on panels	CAISE with input from NSF	✓
Policies to hold PIs/Centers accountable for BI work		✓
Tell NABI to tell NSF to put BI experts on review panels + tell EHR to talk to other directorates		✓
Write proposal← what makes a good BI Review proposal ← tell reviewers what makes a good BI. "If I were reviewing, I'd look for 1, 2, 3,…". Tell NSF about this—NABI make recommendations for official processes. Site visits/project reports ← how to scrutinize BI at the phase/be sure to ask for it. Tell scientists to include BI in the review.	NABI	
Specific (qualitative?) criteria system for rating quality of outreach design (for actual impact) for use by NSF science directorates		
All NSF to fund report re: how to evaluate BI in proposals/how to improve review process		
Scientific society's comms/outreach/PES staff could help create and/or disseminate to members	Science societies	
NSF panels should be 50% BI, 50% science experts		
Create written 2-pager for POs and reviewers	NABI working group	
For BI—less emphasis on novelty		

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Key Areas of Need: *Current and Past Productive Areas of Informal Science Education Research and Evaluation.*

Creating or identifying mechanisms for access to available strategies and evaluation instruments that work within multiple informal learning contexts.

Action Item	Who?	Rating
ISE evaluation meeting/workshop • Evaluators presenting tools • Centers sharing practices of evaluation • Logic models • Connections to evaluators	CAISE	✓✓✓✓
Have a small number of STEM evaluators as consultants and in "retainer" to help with specific evaluation questions and needs	CAISE, maybe an AEA intern?	✓✓
Create and house a series of evaluation capacity building workshops (goal setting, logic modeling, finding instruments, applying evaluation results); make sure the natural science PI (if appropriate) attends	CAISE in partnership with STEM and/or ECB evaluators from AEA	✓✓
Require that BI be evaluated		✓
Evaluation workshops for EPO/EOD directors (after common measures)		✓
Create common measurements/tools for Centers		✓
Dissemination workshops for evaluation resources, MUST be specific	Current evaluators	✓
Have Centers + Large Facilities develop evaluation plans together and using similar system	NISE Net + BI Guide	✓
IRB requirements and training for EOD (formal/informal)	CAISE, NSF	
List of evaluation strategies and instruments along with specific itemization of IRB requirements, general list of past validity, references to past studies	CAISE (they've already got the bones of it)	

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Key Areas of Need: *Current and Past Productive Areas of Informal Science Education Research and Evaluation.*

Developing mechanisms to support "systems thinking" in public engagement and broader impacts communities to build capacity and leverage existing resources.

Action Item	Who?	Rating
Build into NSF program announcements requirement to address more seriously lasting goals of BI		

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Key Areas of Need: Implications for Informal Science Education from Recent Science of Science Communication Findings

Dyad presenters:

John Besley
Associate Professor and Ellis N. Brandt Chair in Public Relations
Michigan State University

Jessica Sickler
Principal Researcher and Managing Director
Lifelong Learning Group, COSI

Rating Key
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✓ = participants proposed as a priority action item

Key Areas of Need: *Implications for Informal Science Education & Outreach from Recent Science of Science Communication Findings.*

Leveraging existing social science research findings and questions to be more reflective and strategic about identifying achievable goals for target audiences (goals could be attitudes, behavior change, understanding, appreciation, etc.).

Action Item	Who?	Rating
Create online repository of relevant literature (would be ideal if it could be shown with reliability # of studies supporting/dismissing similar to the government's Education That Works website nobody seems to know about)	CAISE	✓✓✓✓
Model strategic goal orientation—be explicit about your goals/strategy	Individuals doing education/outreach/BI	✓✓
Need to figure out a language to talk about different pieces—goals? Objectives? Etc.		✓
Have social science/learning science researchers interact with communication researchers	NSF workshop proposal?	
Every ISE expert should talk to colleagues in the communication department		

Rating Key

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Key Areas of Need: *Implications for Informal Science Education & Outreach from Recent Science of Science Communication Findings.*

Leveraging and/or making sense of existing options for science communication training.

Action Item	Who?	Rating
Database of providers [layer interactive map] with reviews? Requires figuring out what evidence-based best practices exist	NABI	✓✓
AAAS could offer science communication train-the-trainer workshops	AAAS	✓✓
CAISE coordinated webinars on science communication	CAISE	✓
Invite communication researchers to more ISE meetings		✓
Require trainees (e.g. grad students) to undergo "effective science communication" training, similar to the required RCR training.		
Cheat sheet of learning theories and how they apply to ISE	Joe Heimlich (COSI Columbus) has something similar to this for environmental education	
List of science communication training offerings	CAISE, AAAS Public Engagement group	
University of Alaska Fairbanks has a science communication certification program for STEM grad students	Contact Laura Conner	
A menu reviewing what communication training is out there. • How long is each program? • How many can it train? • How much does it cost? • How adaptable is the program? • Will they train the trainers (so is it sustainable at the institution)? • Has it been evaluated? • What are the results? Successes?		

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Key Areas of Need: *Implications for Informal Science Education & Outreach from Recent Science of Science Communication Findings.*

Identifying and accessing the most relevant literature to plan, implement and evaluate education, outreach and/or Broader Impacts activities.

Action Item	Who?	Rating
Awareness of educational research outcomes from BI as a tool to inform decision makers (e.g. NSF, Center directors)	NABI	

Rating Key

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Key Areas of Need: *Implications for Informal Science Education & Outreach from Recent Science of Science Communication Findings.*

Disentangling authentic, proven communication strategies from manipulations and tactics that are transparent and ineffective.

Action Item	Who?	Rating
Develop "how to create a science communication strategic plan") similar to PI guide for evaluation) for CAISE/other websites	Science Communication societies (ask John Besley	✓✓
Figuring out question 12 ("Leveraging existing social science research findings and questions to be more reflective and strategic about identifying achievable goals for target audiences (goals could be attitudes, behavior change, understanding, appreciation, etc.) is central to better training. Focus in science communication in quality, not quantity or novelty.		

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Key Areas of Need: New Ideas

Rating Key

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Key Areas of Need: *New Ideas not surfaced on Day 1.*

Action Item	Who?	Rating
Go to ASTC, VSA, etc. meetings to ⇧ skills/knowledge		
Broader Participation: ISE needs to create and disseminate mechanisms to broaden participation in terms of academics + scientists + institutions		

Rating Key

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