Preparing Scientists for Working with Family Audiences

Seven Organizations Report on a New *Streamlined* Approach

NISE network
NANOSCALE INFORMAL SCIENCE EDUCATION

Organizers: Carol Lynn Alpert & Karine Thate (MOS Boston)

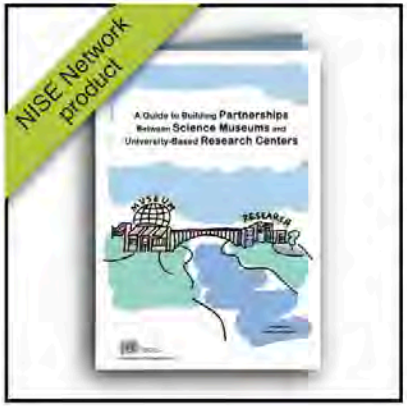
PANELISTS: Anna Barr (Cal Academy), Tracy Englert (USM-Hattiesburg), Sarah Fisk (CNSE-Troy), Hardin Engelhardt (Marbles-Raleigh), Regina Hall (MNHS-Cincinnati), Jessie Herbert (spectrUM-Missoula)

Network Wide Meeting – June 4, 2015 St. Paul

Bridging between the academy and the community…

free pdf on nisenet.org

A Guide to Building Partnerships Between Science Museums and University-Based Research Centers



Description:
Step-by-step advice on planning, developing, funding, and maintaining education outreach partnerships between research centers and museums. This 50-page guide is an updated and consolidated version of the older "Small Steps, Big Impact" guide posted online. Helpful for both science museum and research center planners, this 2013 edition is available both as a free 25-page landscape-view PDF download and as a handy 50-page 6x9 printed booklet that can be ordered for $12 including shipping from the Museum of Science, Boston.

Product category:
For Scientists
Professional Development
For Educators

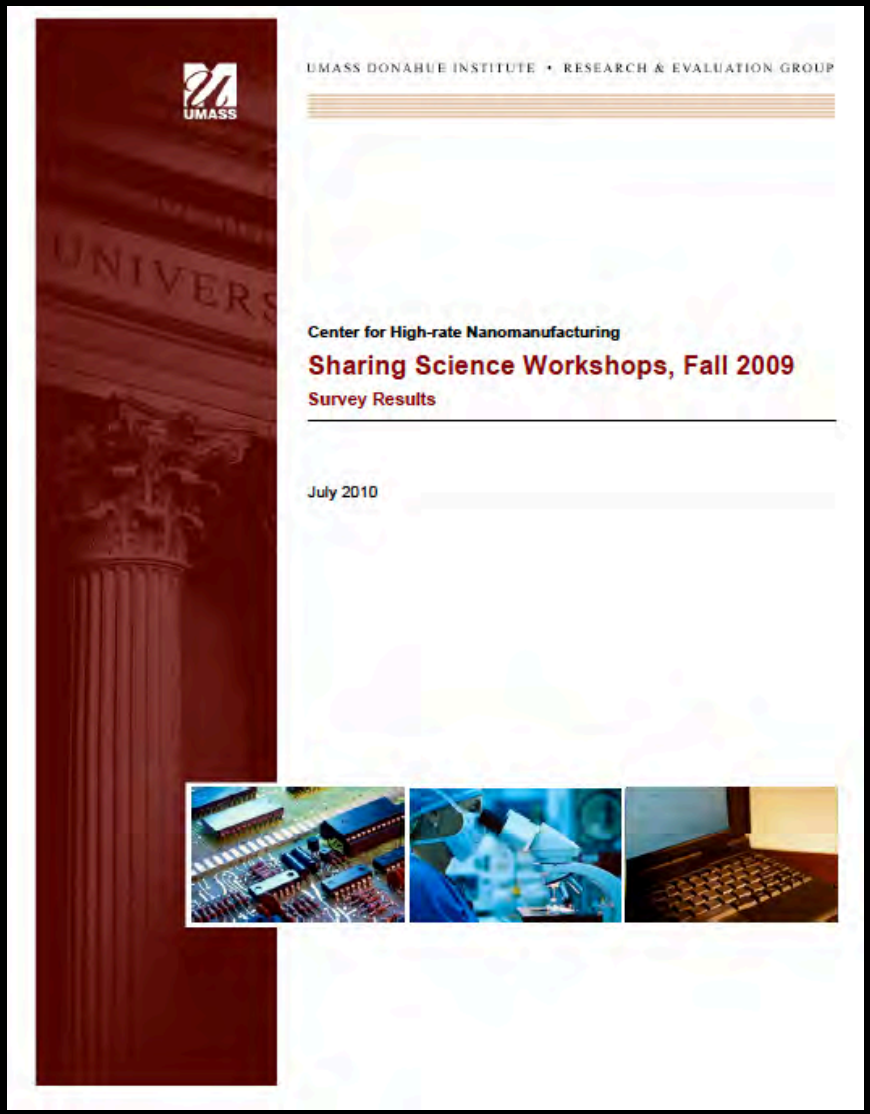
Audience:
Scientists
Informal Science Educators

Grad students in the exhibit halls


QAHE Behavior Observed at Low Temperature
Chang et al., Science 2013
A
30 mK
B
30 mK
Raw Data
Qualitatively similar behavior of low temperature transport
Here, higher B required to see dissipationless state
Quantization of R_{xy} similar to
STO, back gate vs. Al_2O_3 top gate


LIVE SCIENCE
PUMPKIN

Sharing Science Workshop & Practicum



UMass Donahue Institute Report

Sharing Science Participant Feedback

Data from more than 140 participants (2009-2014):

- All participants report they enjoyed the practicum
- 88% found workshop very/extremely useful
- 93% report increased confidence in engaging visitors with science demos and conversations
- 85% felt it would help their careers in science & teaching.

Sharing Science Participant Feedback

"This was a wonderful experience. I feel much more confident explaining a complicated topic to non-scientists."

"I really liked interacting with museum visitors. The best part was that the adults were as excited to learn as the children."

"It gave me ideas about communicating with different audiences."

"It increased my confidence and made me more relaxed."

"The workshop gave me an idea of communicating better with professionals as well as nonprofessionals in my daily life."

Sharing Science - free on nisenet.org

Sharing Science Workshop & Practicum Planning & Implementation Guide

Description:
This Guide provides information and resources for planning and hosting a Sharing Science Workshop & Practicum for early career researchers that will enhance their science communication skills, engage their interest in education and outreach, and prepare them for providing effective and rewarding education outreach experiences.
An updated version (v 3.0) of the guide and materials was posted in February 2015. Contact nano@mos.org with questions/comments.

Product category:
For Scientists
Professional Development
For Educators

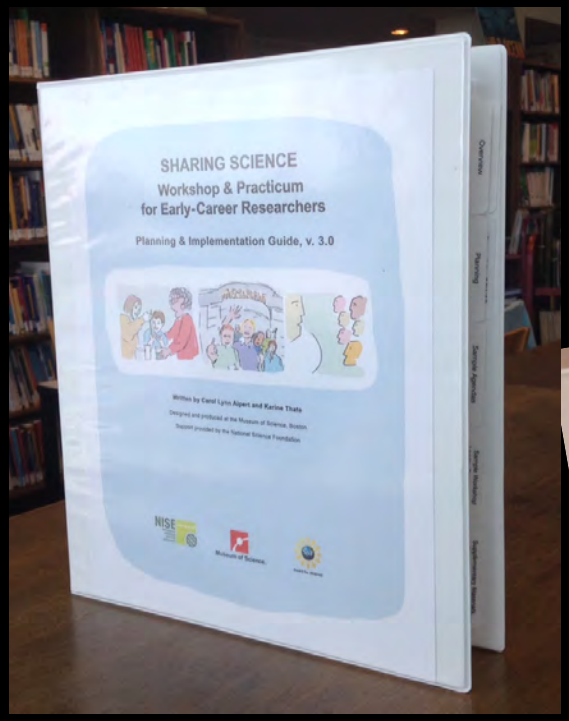
Audience:
Scientists
Informal Science Educators

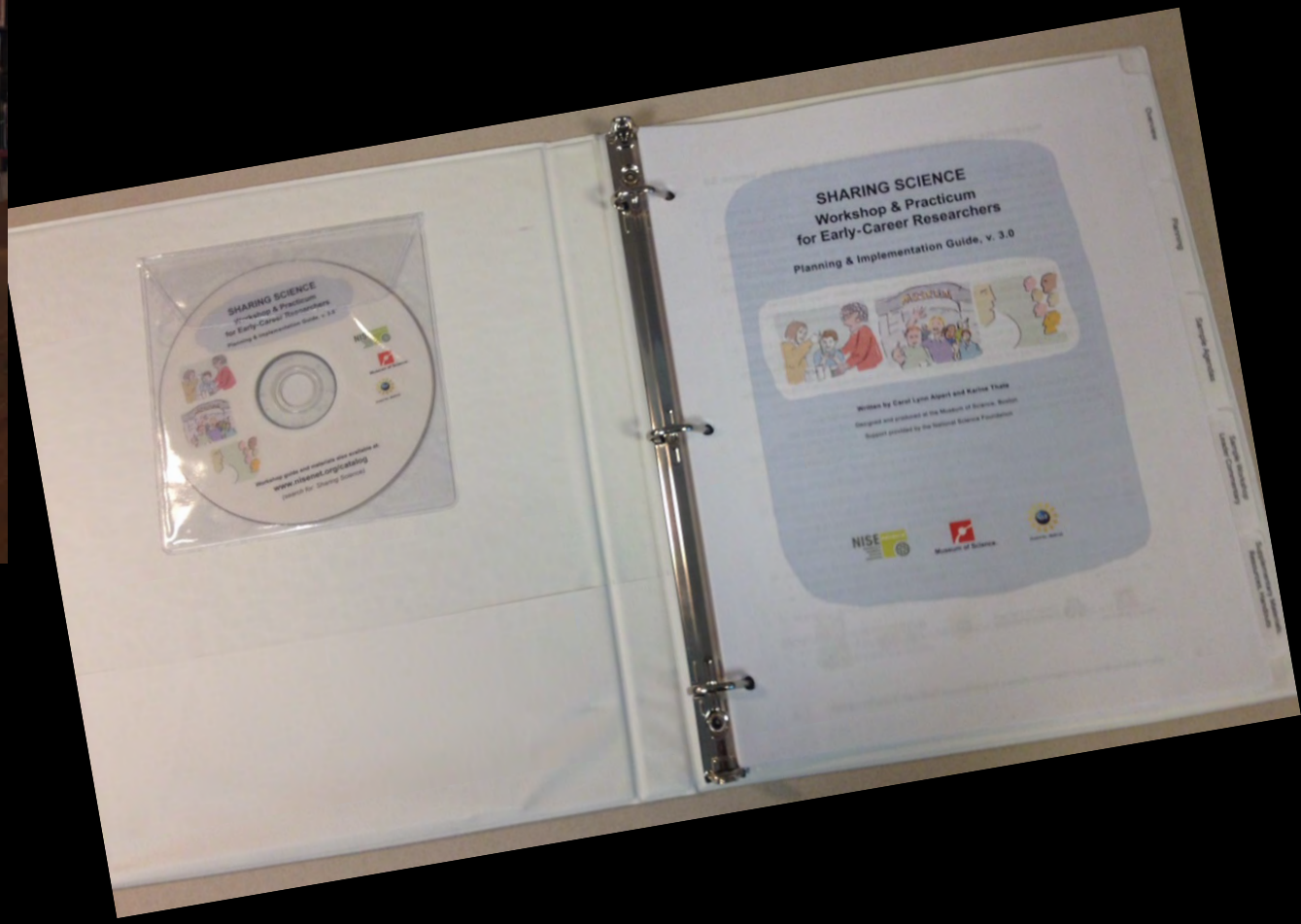
Resources

Objectives

Sharing Science

Planning & Implementation Guide free on nisenet.org

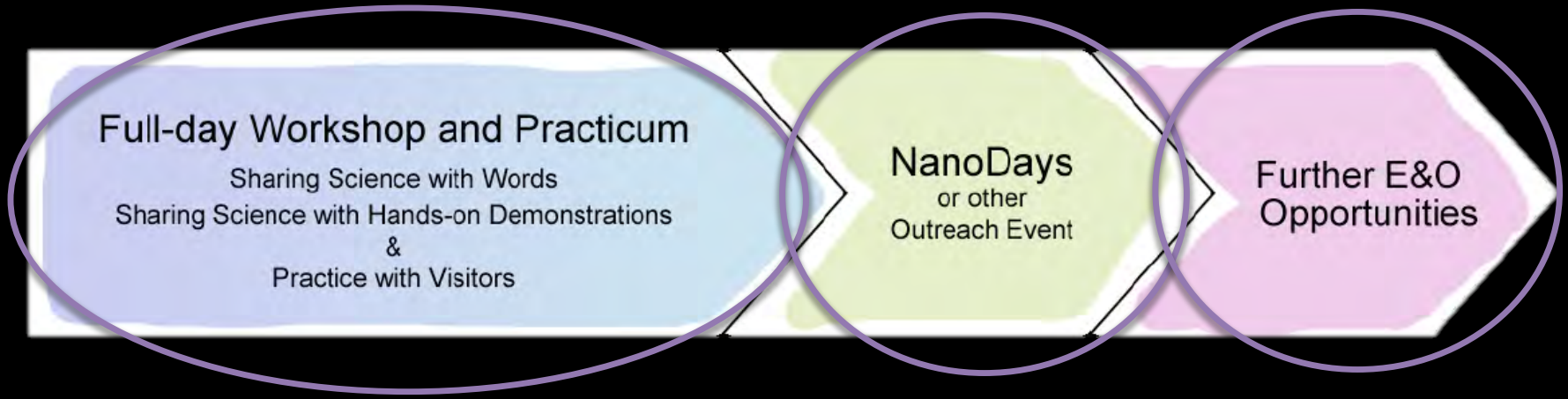




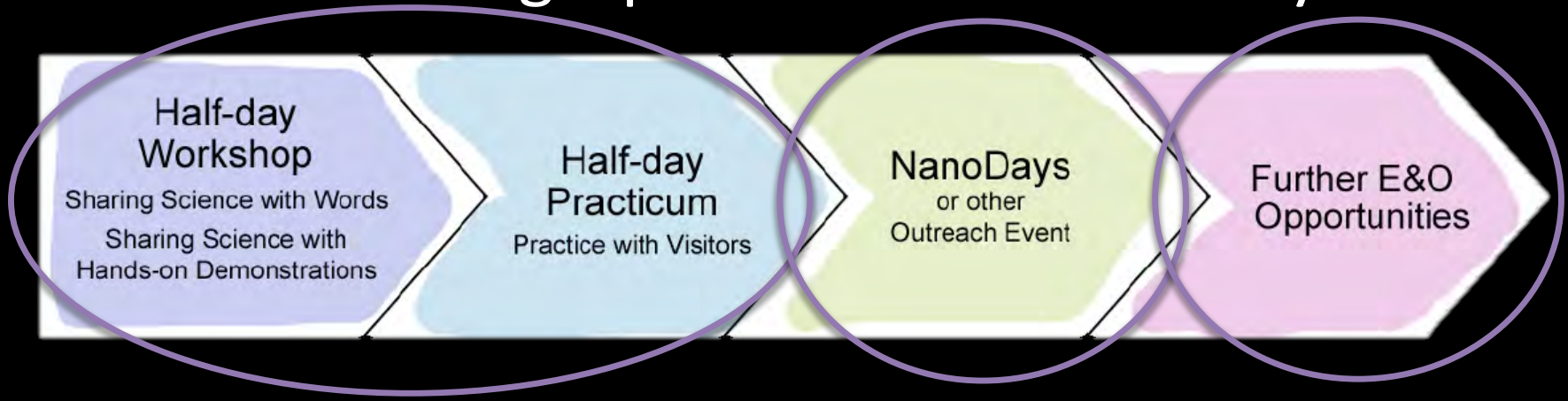
kthate@mos.org
calpert@mos.org
nano@mos.org

So, what happens during the Sharing Science Workshop & Practicum?

Scheduling Option 1 – One Full-Day



Scheduling Option 2 – Two Half-Days



Welcome! We're warming up with professional-style introductions.

(Pretend you're at a science conference networking session)

Don't forget to… breathe, smile, make eye-contact, provide the motivation for your work, show interest in others.

Sharing Science with Words

Rapid Prototyping: Design a brief intro for 12 year old

- ✓ How to engage?
- ✓ What language to use?
- ✓ How to make relevant?

- Small group practice with feedback, then try again!

Sharing Science with Hands-On Demos

Part 1: What makes for a good hands-on experience?

The Nanoscience Demonstrator's Guide

1. What is there for the visitor or student *to DO*?
2. How can I *pique their curiosity* about what I have to offer?
3. Where is the *"aha"* moment? How can I *enhance* or *dramatize* this moment of discovery?
4. What does the demo *reveal?* (e.g., observable phenomena). How does it compare to "normal" or "expected" behavior?
5. How can I help them *guess* at possible explanations*?*
6. How can I help them think of ways *to test* possible explanations?
7. What does the demo reveal about *underlying nanoscale properties* or behavior*?* How can I explain this in *very simple* language? *What analogies* can I suggest?
8. How can I help them begin to imagine ways that this behavior could be *harnessed to help us* do something?
9. How can I bring the interaction to a *satisfying* close*?*
10. How can I tell if it was a *successful* interaction?

Sharing Science with Hands-On Demos

Part 2: Practice with Peers, Get Feedback

Practicum on the Museum Floor

- Use new skills right away
- Test out different strategies
- Practice in low-stakes setting

Debrief and Brainstorm

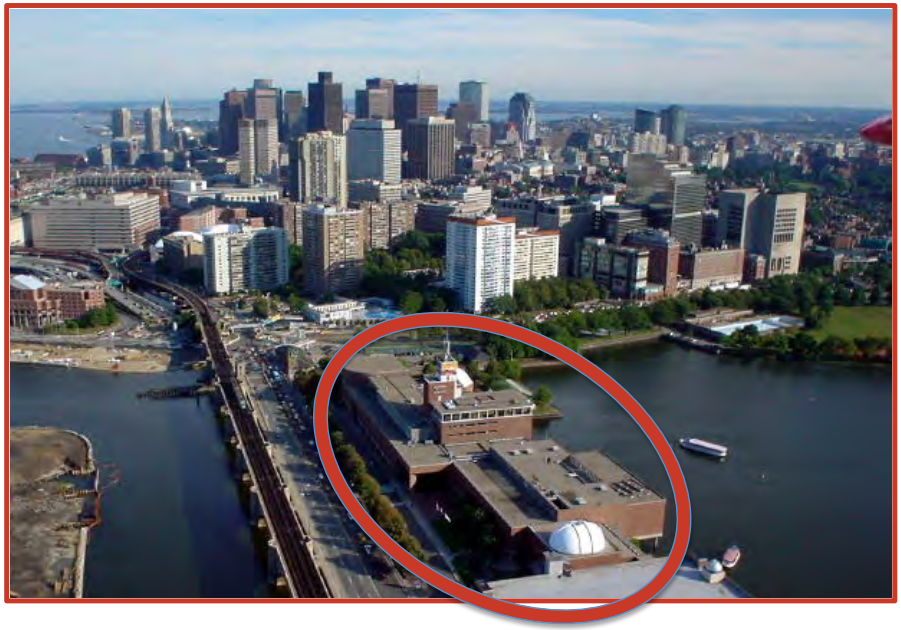
How could we teach others to lead the workshop?

CIQM CENTER for INTEGRATED QUANTUM MATERIALS

Gain valuable experience in science education & outreach...

Sharing Science Workshop & Practicum

for CIQM students and faculty
at the Museum of Science, Boston



Museum of Science

Saturday, November 15, 10 am - 4 pm

Lunch vouchers and free parking provided

Online applications due October 24
http://bit.ly/1Cisozq

Questions? ciqm@mos.org

DMR-1231319

RISE Dissemination Workshop

November 2014

Alex Laube

Sarah Fisk

Brian Pollock

Tracy Englert

Nick Wethington

Anna Barr


Exploring
Products—
Computer Hard Drives


NanoFabric


Exploring
Materials—
Graphene


What did you like BEST about
I ♥ NANO

So, how did it go?

Sarah Fisk

CNSE Children's Museum of Science & Technology

Anna Barr

California Academy of Sciences

Regina Hall

Museum of Natural History & Science, Cincinnati

Tracy Englert

University of Southern Mississippi

Jessie Herbert

spectrUM Discovery Area

Hardin Englehardt

Marbles Kids Museum

CHILDREN'S MUSEUM
OF SCIENCE + TECHNOLOGY

The CNSE Children's Museum of Science and Technology

Sarah Fisk
Director of Education &
Museum Experience

iSSW&P in Boston

Challenges For My Institution

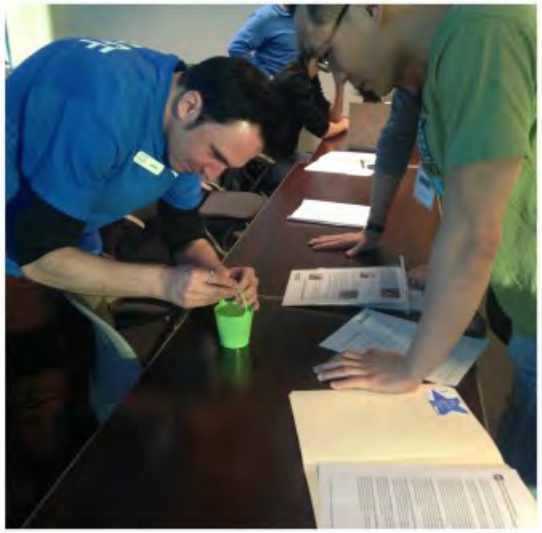
- Limited Pool of Potential Partners for the First Sharing Science Workshop
- Workshop Facilitation Space
- Transportation to The Museum
- No budget for any "extras"

Implementation

- Finalized Details
  - Schedule
  - Reserve Spaces
  - Identify Staff Participants
- Put out a call to participate to CNSE
- Sent Out Pre-Workshop Surveys

Implementation: Workshop





Implementation: Practicum

Results

- 9 Total Participants
  - 1 CNSE Staff Member
  - 2 CNSE Faculty Members
  - 3 CNSE Grad Students
  - 3 CNSE Undergrad Students
- All of the participants indicated that they had some level of interest in participating in volunteer science education and outreach activities during the next year or two.
- They also all agreed that working with visitors was personally rewarding.
- Everyone also agreed that as a result of the workshop & hands-on experience at The Museum that they felt more confident speaking about their research with non-scientist.

Impacts

"Science is about relating to your audience.
If you can relate to them and speak their language you will always succeed."

"Thank you for the learning experience.
I really enjoyed it and learned much more about relating science to other people. "

Impacts

- CNSE CMOST Staff
- Students
- Visitors

Future Plans

Preparing Scientists for Working with Family Audiences

Anna Barr
Public Programs Specialist
California Academy of Sciences

CALIFORNIA ACADEMY OF SCIENCES

A Little About Me

California Academy of Sciences: Explore, Explain, and Sustain Life

An aquarium, planetarium, and natural history museum—all under one living roof!

NanoDays in the Naturalist Center

iSSW&P Experience

- Workshop about giving a workshop—pretty much all the tools you need!
- Chance to observe and participate in actual workshop
- Networking, professional development opportunity

Implementation

- Full-day workshop and asked participants to come back for NanoDays
- Co-taught with colleague
- Sent out invitations to Stanford Nano Shared Facilities and UC San Francisco labs

Implementation Successes

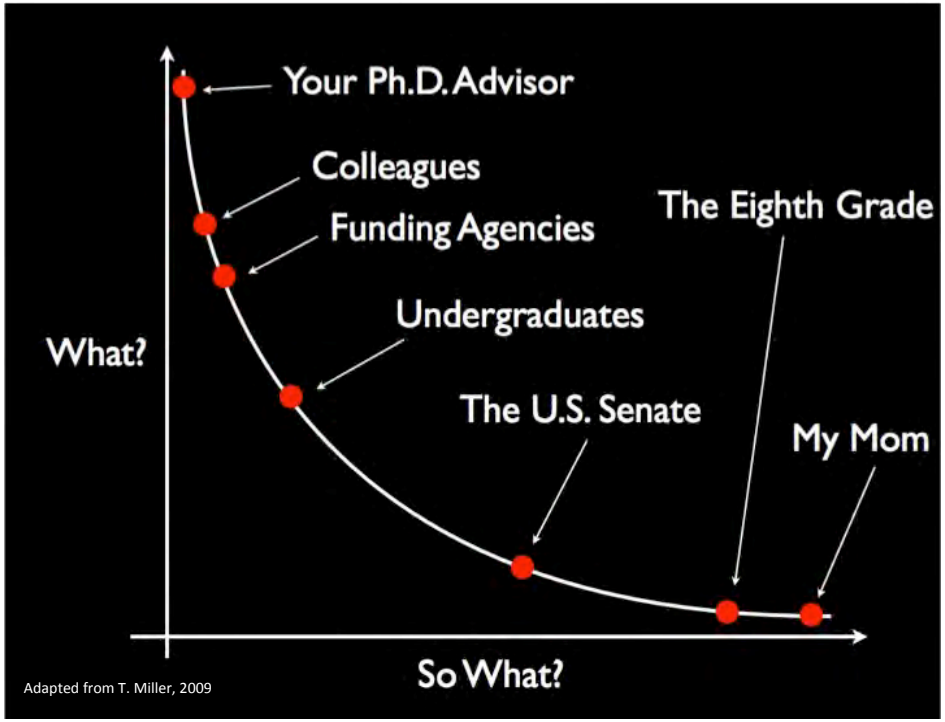
- Colleague was indispensible!
- Five participants: All reported more confidence speaking about research to non-scientists and would recommend to peers
- Opened doors to future partnerships
- Bonus staff training

Implementation Challenges

- More prep time for first offering
- Tardy participants
- More participants?
- Tricky for participants to stay on “so what?” part of research and do so within time constraint
- Matching appropriate demo to research

Impacts on My Practice

- Good reminders for best practice: Keep audience in mind, take-home messages, etc.
- Professional development opportunity
- Springboard for similar offerings?



Impacts on Participants

- All agreed working with visitors was personally rewarding and most found practicum part the best part
- Equally interested before and after in participating in volunteer/outreach activities

Impacts on Participants

» Take-home lessons:

"When in doubt, add more details about the significance of my work instead of the details. Always pay attention to the audience's engagement and adjust content to be more appropriate."

"Sometimes it's best to let the kids make the discoveries and learn the big picture while talking about the scientific implications with the parents so they're also involved."

Impacts on Visitors

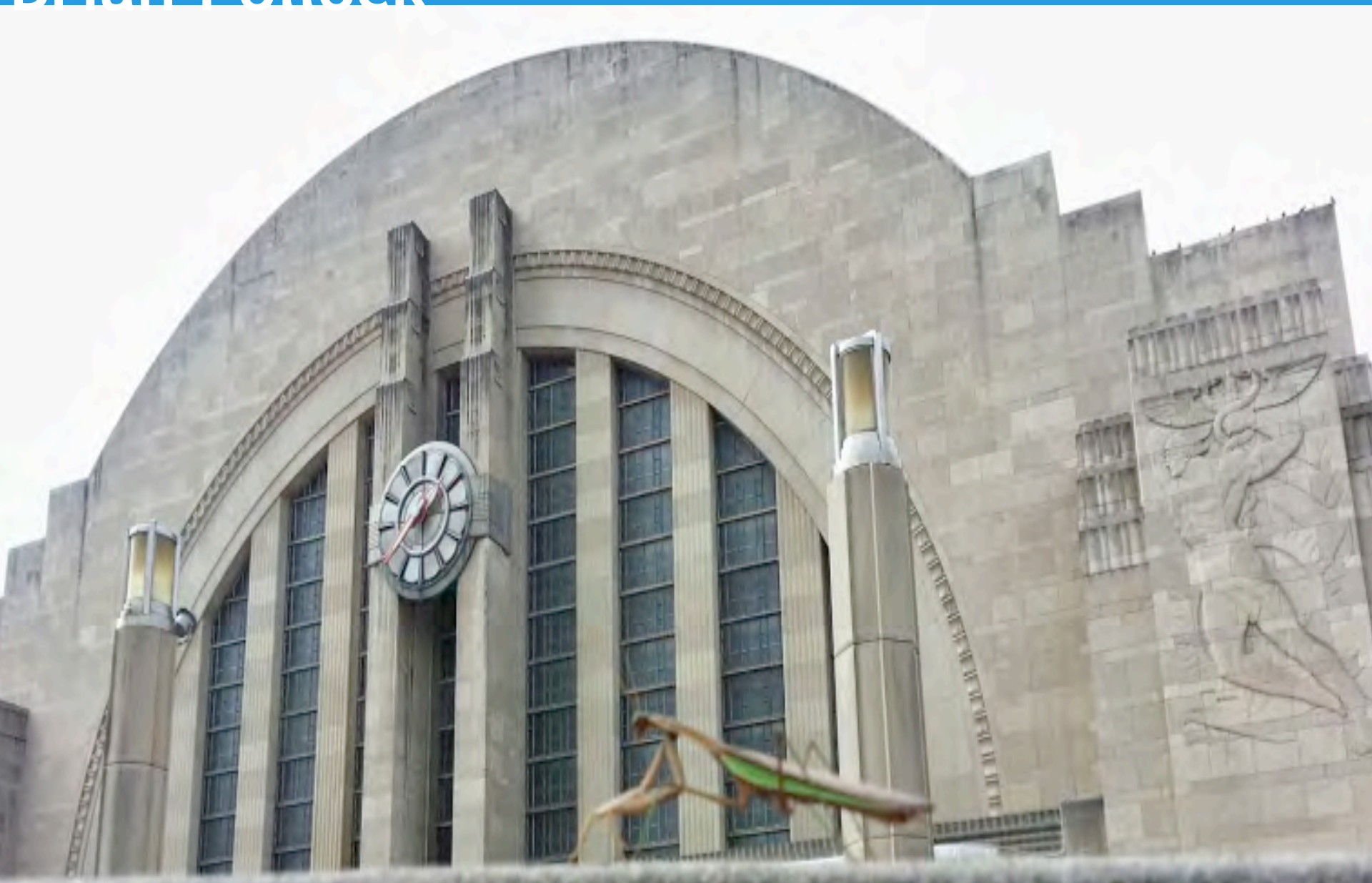
- More NanoDays activities (and a couple surprise ones on workshop day!)
- Chance to talk with real researchers
- Chance to learn from better-prepared researchers!

Future Plans?

- Would love to offer on annual basis, but . . .
- Public Programs merger: Fewer or perhaps more opportunities?

Brian Pollock

STEM Discovery Lab Coordinator
Museum of Natural History & Science
Cincinnati Museum Center



Cincinnati Museum Center

- Museum of Natural History & Science
- Cincinnati History Museum
- Duke Energy Children's Museum
- Special Exhibit Hall, The Edge of Appalachia Nature Preserve, Cincinnati Historical Library, Geier Research and Collection Facility, OMNIMAX Theater, and more.

Cincinnati Museum Center

STEM Discovery Lab

Brian Pollock
STEM Discovery Lab Coordinator
Museum of Natural History & Science at Cincinnati Museum Center

Cincinnati Museum Center

NanoDays

- Began presenting NanoDays in 2009
- Expanded Presenter list to include University of Cincinnati, Miami University, The University of Northern Kentucky, The College of Mt. St. Joseph, the American Chemical Society and the United States Air Force and Boy Scouts of America Troop 956
- Over 5,000 visitors for NanoDays 2015

The future of NanoDays at CMC

Cincinnati Museum Center

Added NanoCamp in the summer of 2013, expanded in 2014, continuing in 2015.

Adding Nano Mini-Exhibition

Expanding presentations to more days and more audiences.

Sharing Science Workshop

Cincinnati Museum Center

Workshop and practicum held March 28, 2015

Nine graduates students and two professors from The University of Cincinnati

Video: Brian’s reflections on SSW&P at Cincinnati Museum Center

Implementing a Sharing Science Workshop & Practicum

Tracy Englert

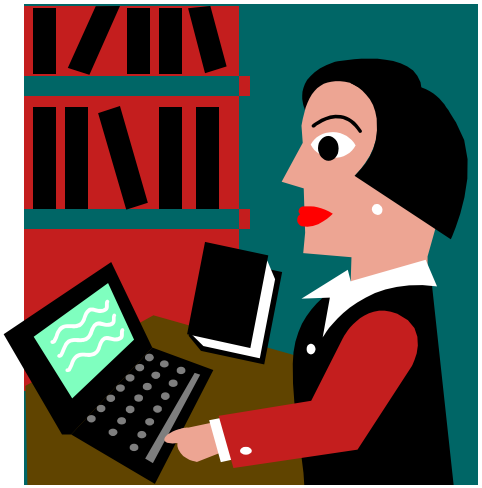
THE UNIVERSITY OF SOUTHERN MISSISSIPPI

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

- Founded: 1905
- Approximately 15,000 Enrollment
- Classified by the Carnegie Foundation as a RU/H: Research University (high research activity)

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

I'm the Reference Librarian for Science & Technology and Associate Professor for University Libraries



I've been at Cook Library since 2001

ILLINOIS

Masters of Science Library and Information Science (2001)

STAR*net*

I'm a community editor for STAR Library Education Network Community of Practice for librarians (including non-host librarians) to interact and partner with STEM professionals and organizations.

*NSF AISL-funded project

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Using the University Library as an setting for Informal STEM Learning

Science Cafes in the Library
This programming series began in 2010 after the Libraries were awarded a Science Café mini-grant from NOVA scienceNow

sciencecafes.org

Since 2010, we've had over 30 faculty members and graduate students present their research to an audience of 1000+ members of the public and university community in the University Library

Experience at iSSW&P

NISE Net workshop in Boston

"I got to do hands-on interpretation on the exhibit floor of the Museum of Science!"

NanoDays @Cook Library

Experience with iSSW&P implementation – success/challenges

What I liked best about the Sharing Science Experience was “talking to peers about the challenges of sharing science to a general audience”

Experience with SSW&P implementation – success/challenges

I found “their reactions toward their own findings” most surprising about working with festival visitors

Experience with iSSW&P implementation – success/challenges

Two of the iSSW&P participants successfully presented a Nano program April 10, 2015 at The Fay B. Kaigler Children's Book Festival

*Part of NISE Net mini-grant

EVERY HERO HAS A STORY

AT THE LIBRARY THIS SUMMER

JUNE

Monday	6/1	All Day	Summer Reading Begins
Tuesday	6/2	9:00-12:00	S.T.E.A.M.* (Hattiesburg)
Wednesday	6/3	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	6/4	10:00-10:30	Petal Story Time
Tuesday	6/9	9:00, 1:00, & 4:00	Movie Matinee (Hattiesburg)
Wednesday	6/10	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	6/11	10:00-10:30	Petal Story Time
		10:00	Festival South Program (Hattiesburg)
		12:00	Festival South Program (Hattiesburg)
Saturday	6/13	1:00-3:00	Star Wars Party (Hattiesburg)
Tuesday	6/16	9:00-12:00	S.T.E.A.M.* (Hattiesburg)
Wednesday	6/17	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	6/18	10:00-10:30	Petal Story Time
Tuesday	6/23	9:00 1:00, & 4:00	Movie Matinee (Hattiesburg)
Wednesday	6/24	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	6/25	10:00-10:20	Petal Story Time
		10:30-11:30	Arts & Crafts (Petal)
Tuesday	6/30	9:00-12:00	S.T.E.A.M.* (Hattiesburg)

JULY

Wednesday	7/1	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	7/2	10:00-10:20	Petal Story Time
		10:45-11:30	S.T.E.A.M.* (Petal)
Friday & Saturday	7/3-7/4	Library Closed	
Tuesay	7/7	9:00, 1:00, & 4:00	Movie Matinee (Hattiesburg)
Wednesday	7/8	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	7/9	10:00-10:30	Petal Story Time
Tuesday	7/14	9:00-12:00	S.T.E.A.M.* (Hattiesburg)
Wednesday	7/15	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	7/16	10:00-10:20	Petal Story Time
		10:45-11:30	S.T.E.A.M.* (Petal)
Tuesday	7/21	9:00, 1:00, & 4:00	Movie Matinee (Hattiesburg)
Wednesday	7/22	9:00-9:30	Group Story Time (Hattiesburg)
		10:00-10:30	Story Time (Hattiesburg)
Thursday	7/23	10:00-10:30	Petal Story Time
Saturday	7/25	1:00-3:00	Super Heroes @ Your Library (Final Party—Hattiesburg)
Saturday	8/1	10:00-4:00	Last Day to Pick Up Prizes

*S.T.E.A.M: Science, Technology, Engineering, Art, Math

Tuesday's S.T.E.A.M. activities target lower elementary through middle grade learners. S.T.E.A.M. programs begin at 9AM and end at 12PM. The program is come-and-go: hands-on activities are self-paced. Reservations are not required.

Selected movies are rated PG.

THE LIBRARY

HATTLIBRARY.COM

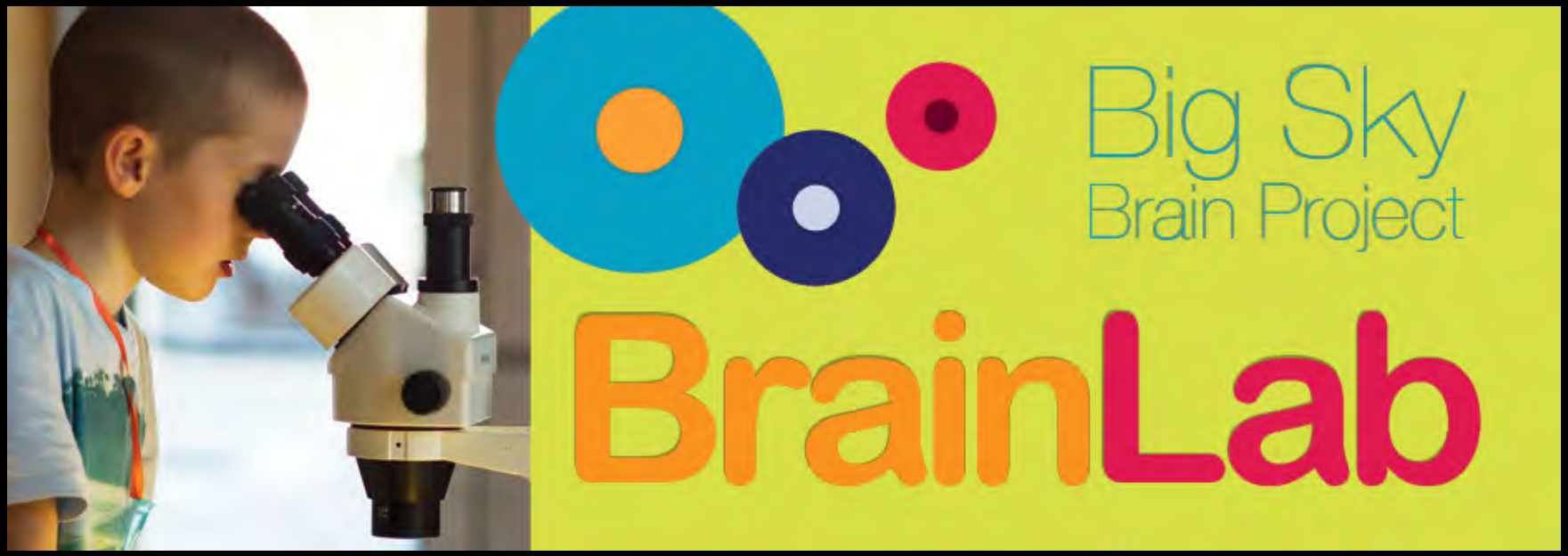
Future Plans:

iSSW&P participants will be presenting a STEAM program using two NISE Net Exploring Material programs: Thin Films and Stained-Glass Windows at the Hattiesburg Public Library this summer to elementary through middle grade learners.


UNIVERSITY OF MONTANA
spectrUM

Museum Overview

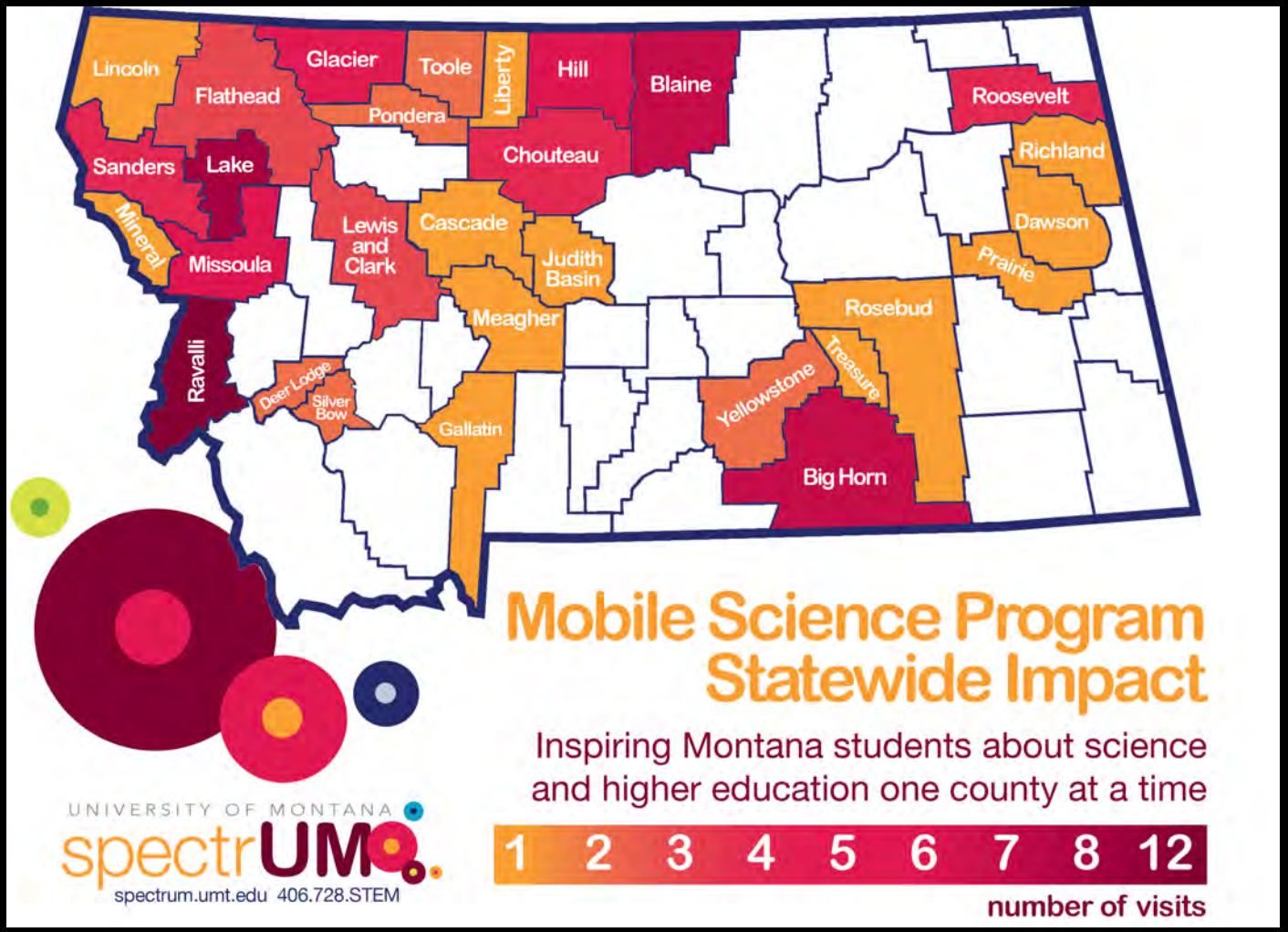
- We are a small museum located in Missoula, MT established through the University of Montana in 2006
- Expanded to downtown location with extended public hours and programming in 2013
- We offer open hours, camps, field trips, birthday parties, local outreach at various events and travel statewide to bring our museum to rural and tribal communities.
- Approx. 55,000 people served per year through all programming
- 30 staff members, only 4 full-time with a mix of volunteers, work-study college students, AmeriCorps Associates and high-school volunteer program
- All of our programs are facilitated hands-on activities led by trained staff - our exhibits are our amazing staff!


Big Sky
Brain Project
BrainLab


Vision Requires 3 things


sciENCE.
TRY iT


LOGAN
PHOTOGRAPHY


Lincoln
Flathead
Glacier
Toole
Liberty
Hill
Blaine
Pondera
Roosevelt
Richland
Sanders
Lake
Chouteau
Mineral
Missoula
Lewis and Clark
Cascade
Judith Basin
Dawson
Prairie
Meagher
Rosebud
Ravalli
Deer Lodge
Silver Bow
Gallatin
Yellowstone
Treasure
Big Horn
Mobile Science Program
Statewide Impact
Inspiring Montana students about science and higher education one county at a time
1 2 3 4 5 6 7 8 12
number of visits
UNIVERSITY OF MONTANA
spectrUM
spectrum.umt.edu 406.728.STEM

SSW&P Workshop and Implementation

- Held on February 28th for 9 graduate students and post-docs
- 3.5 hour workshop, with practicum scheduled individually to follow (Nano Days, other visits)
- We saw a marked increase in ability of participants to engage with visitors, especially younger children
- All participants found the workshop useful, especially the rapid prototyping introduction
- Most participants expressed interest in another workshop, and also will help recruit for fall implementation
- Utilizing the NISE-Net nano activities proved to be a bit of a challenge, but was good for participants to step outside their areas of research to explain science

SSW&P Workshop and Implementation

- We regularly host graduate students and post-docs for presentations and activities about their research during open hours and at camps and clubs
- We recruited most of the participants through this network of volunteers
- This workshop was a great way to engage with them further and provide professional development to improve their skills in communicating science to the public
- Splitting the workshop and practicum seemed to work out well, but a few of the participants were unable to get a practicum scheduled before finals/ summer obligations
- Next planned implementation is fall 2015 for training of next year's volunteers

Grad Student and University Researcher Presentations

Explaining Heat Transfer and Nano

Crash Course in Nano Fabric

Questions?

nicholos.wethington@umontana.edu

www.spectrum.umt.edu

UNIVERSITY OF MONTANA

spectrUM

406-728-STEM


Marbles Kids Museum
Raleigh, NC
Maximizing Your Nano Outreach & Education Impact
Hardin Engelhardt
Education and Evaluation Specialist

Alex Laube, STEM Play Lead
Hardin Engelhardt, Education and Evaluation Specialist


IDEAS
INSPIRATION TAKES FLIGHT
STACKING
BUILDS QUICKLY BUT NOT STRONG
NEED TO INTERLOCK PARTS WHY UP!
Building BIG futures.
Problem-solving.
Communicating.
Creating.
Collaborating.


TODAY'S SPECIALS
Fruit Smoothie
Veggie Stir Fry
Tossed Salad
EXIT
MILK


MoneyPalooza
In partnership with your North Carolina banks


POWER
CONTROL CENTER
HOME
SWEET
HOME
FLIP
THE
SWITCH
AND
CONTROL
THE
FLOW
ELECTRICITY
FLOWS IN
WIRES
BEHIND THE
WALLS

IMAX


Harry Potter
AND THE HALF-BLOOD PRINCE
SELECT SCENES EXCLUSIVELY IN IMAX 3D
TRANSFORMERS
REVENGE OF THE FALLEN
EXPERIENCE IT IN IMAX
STAR TREK
See More
IMAX

Workshop Reflection Video

Alex Laube

Maximize Your Outreach and Education Impact Workshops


Sharing Science!
Brad Herring
Director of Nanoscale Informal Science Education
Multimedia Developer
Museum of Life and Science
Alex Laube
STEM Program Play Lead
Marbles Kids Museum

AGENDA

1. IMAX Experience, Food, and Networking
2. Introduction to NISENet
3. Tips and Tricks for Visitor Engagement
4. What Good Looks Like
5. Setting Up for Success
6. Practice and Coaching


Impact
Learning and growing
with the children we serve


Create. Innovate.
Grow Up Green.
Connect and Communicate.
Toddler's Hollow
Carbon Copy


SPLASH


OF THE
YEAR


Connect and Communicate
ULINE


Liquid
Nitrogen Ice
Cream


BEACH, NC

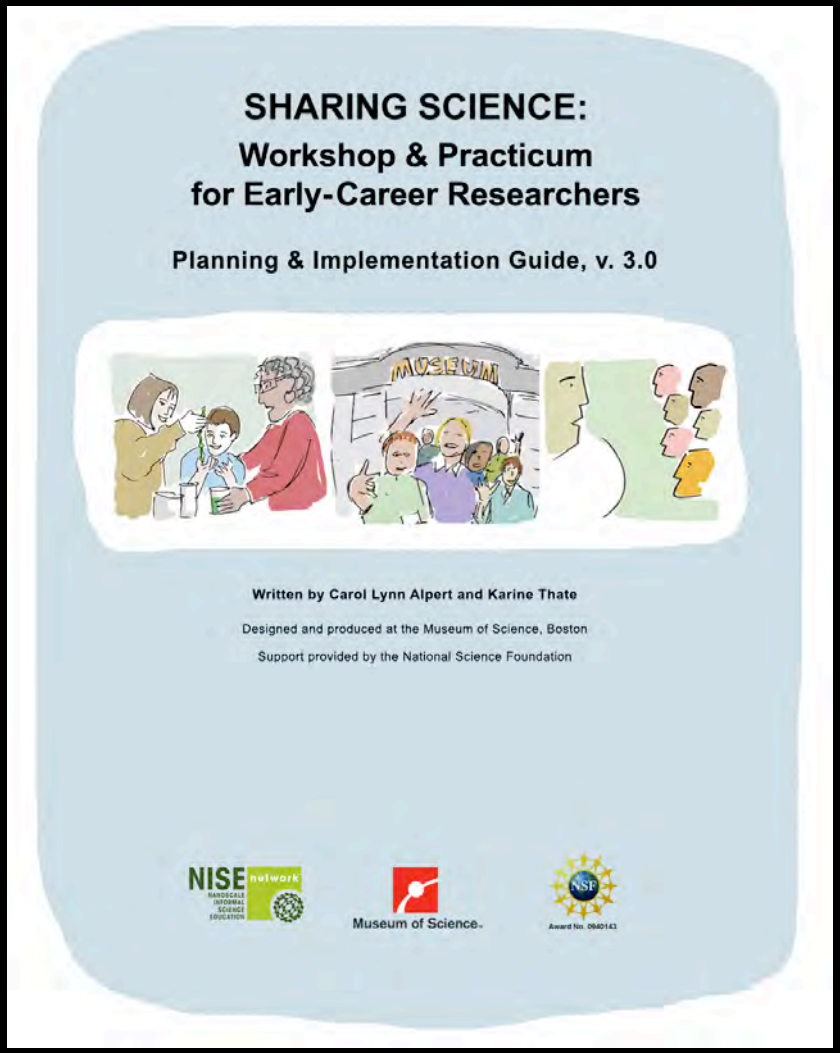

CEINT


Kids WAY

Discussion
& Questions

Are you interested in implementing the Sharing Science Workshop & Practicum at YOUR institution?

Let us know!



Thank you!

NISE network
NANOSCALE INFORMAL SCIENCE EDUCATION

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