

# Open Space Discussion on Media / Online / New Technologies for Informal STEM Learning – August 22, 2014

## Final Participants & Project List

This session focused on how media, online or mobile technologies or other learning technologies contribute to the ecosystem of STEM. There were 23 participants, all of whom contributed to an impressive discussion of the great diversity of media and technology related AISL projects and comparable projects supported by other NSF divisions and other funders.

Each participant is listed below, with their institution, their AISL project with links, other related projects, and issues they're facing. The issues are summarized in the final section.

This catalogue of projects is a treasure trove of innovation and, hopefully, a resource for everyone using media and technology for informal science learning. The list also includes related projects represented at the PI meeting in the technology domain, but whose PIs were not in this session. We've taken the time to include links to the corresponding NSF abstracts, to save you searching.

The session was pitched with this abstract: There are many questions about technology and the informal science learning ecosystem. (For more on this concept, see John Falk's paper for the Wellcome Trust and the Science Learning + initiative, <http://goo.gl/ifHOrW> ) Among the questions: How emerging technologies and transmedia platforms engage informal science learners; the capacity of short YouTube-like videos to teach STEM; augmented reality (AR) in a museum or alternate reality games tied to learning in the real world; the use and impact of digital badges; the opportunity to share mobile tech solutions and research how/if they work in different settings; the opportunity to use mobile/online tools for learning research; the effect of social media on STEM learning; and bridging in-school and out-of-school learning with digital tools.

- Richard Hudson, Saul Rockman

## Attendees and Projects with links to the NSF abstract

### MODERATORS

#### **Richard Hudson, Twin Cities Public Television.**

AISL Project: Citizen SciGirls Transmedia and Research to Encourage Girls in STEM. 1323713.

<http://goo.gl/bPKsU1> , [www.scigirls.org](http://www.scigirls.org) .

#### **Saul Rockman, Rockman et al [moderator]**

“I helped Thomas Edison get his first NSF grant!” Evaluator on many informal science learning projects, including the KQED Quest project.

See [www.rockman.com](http://www.rockman.com)

Saul did major report on the impact of Bill Nye the Science Guy, archived here: <http://goo.gl/xMogqW>

## PARTICIPANTS

### **Brad Herring, Museum of Life and Science**

AISL Project: Nanoscale Informal Science Education Network. 940143. <http://goo.gl/n6kj84> .

Specializing in video production, creating training videos with educators in the field. Also helping scientists create personal videos. Lots of videography in the Research Triangle area.

Exploring the iDoc format, an interactive documentary, created online, with multiple avenues for participation: See <http://i-docs.org/about-idocs/>

### **Bruce MacFadden, University of Florida**

AISL Project: FOSSIL: Fostering Opportunities for Synergistic STEM with Informal Learners [paleontology network] NSF# 1322725 - <http://goo.gl/8s8SI8>

Developing an online network and community of practice (CoP) among amateur and professional paleontologists across the country, a “cyber-enabled” fossil network. 100 Million Fossils are in distribution; putting them into a cloud-based data system.

Interested in awards, particularly Digital Badges.

### **Bryan Pijanowski, Purdue University**

AISL Project: Global Soundscapes! The Big Data, Big Screens, Open Ears Project. 1323615.

<http://goo.gl/XGNHBI>.

Soundscapes ecology takes the sounds that surround us and make meaning.

Fairly accessible to youth... what you hear is what we study; researchers go to remote spaces, study with sensors. All of the data is online... trying to develop multimedia products that merge the visual and the auditory. Working in an Imax setting – teaching youth about the physics of sound, biology of hearing, the role that sound has in ecology and nature

Related projects:

Tim Archer, Foxfire Interactive, schools for the blind

Record the Earth... project for Earth Day - <http://goo.gl/BuHgSb>

Uploads to a map... “Record the Earth for a Day”

Trended so high on social media that we got on Today show on Earth Day

Sound is a deep psychological force!

Expanding to MOOCs

The App – Soundscape Recorder

### **Cathy Ferree, Conner Prairie Museum**

AISL Project: Prairie Science: Integrating Informal Science and History Learning through Family Dialogue. 1223770. <http://goo.gl/RnCr5I>.

AISL Project: Prairie Science: Integrating Informal Science and History Learning through Family Dialogue NSF# 1223770 - <http://goo.gl/RnCr5I>

Open-ended activities in an environment based on rural electrification

Looking at the past and present, circuits are a circle

Related projects: Indianapolis – combined history and stem education ( <http://goo.gl/bgXvL2> )  
Interested in technology applications in formal education for elementary school, virtual field trips

### **Dale McCreedy, Franklin Institute Science Museum**

AISL Project: LEAP into Science: Engaging Diverse Communities in Science and Literacy, NSF# 1223730 ,  
<http://goo.gl/wpedZN>

Supporting adults as critical intermediaries between the museum and youth.

Collaborations with libraries to encourage science learning; as we work with our partners, huge success with an established WIKI. We provide core resources AND allow people to share Ten sites – how can we expand PD resources to serve a larger community?

Also have an ITEST grant, “Integrating Science into Afterschool.” <http://goo.gl/2ls1N3>

Noyce Project: Click2Science: <http://www.click2sciencepd.org/> Uses Technology for PD

Also Co-PI on Secrets of the Universe on the Hadron Collider, and outreach with special emphasis on reaching middle school girls. <http://goo.gl/2se1t1>

### **Derek Hansen, Brigham Young University**

AISL Project: Advancing Informal STEM Learning Through Scientific Alternate Reality Games, NSF# 1323787 , <http://goo.gl/eztfpo>

Developing stories that play out across multiple media; games that play out in the real world; and a story that advances over time. Players contribute online and offline over the course of the game.

White Paper: Dust – An NSF-Funded Alternate Reality Game. A new project; kids will pay with data-collection, partner with NASA, investigate meteorites from another solar system, using mobile apps, web apps, to discover exoplanets with transit data. <http://goo.gl/5fKblg>

Other relevant projects:

Vanished, from MIT and Smithsonian, <http://goo.gl/2LnbqU> Evaluation: <http://goo.gl/XRgisc>

Ghosts of a Chance game <http://www.ghostsofachance.com/>

(See final report at this link)

Arcane Gallery of Gadgetry Game: [http://www.arcane gallery of gadgetry.org/](http://www.arcanegalleryofgadgetry.org/)

Pheon Game: <http://goo.gl/cfQbyx>

### **Ethan Allen, Pacific Resources for Education and Learning**

AISL Project: Water for Life: Community Education for Water Conservation and Rainwater Harvesting in the United States Affiliated Pacific Islands, NSF# 1224185 , <http://goo.gl/FZ25Si>

Using technology for communities in remote islands; Want to get these people to share their stories, particularly re water. Challenge is that subjects don't want to write, or participate in a blog

Host on YouTube talk-show series, “Likable Science” channel on YouTube <http://goo.gl/TfwTYE>

Interview with Ethan about his organization and his work: <http://goo.gl/PgjvIU>

### **Geoffrey Haines-Stiles, Geoff Haines-Stiles Productions**

AISL Project: EARTH: The Operators' Manual, NSF# 0917564 , <http://goo.gl/DxvfI>

New Award – the Crowd in the Cloud Project, on citizen science. 4 x 1 hour public television programs; one of the goals is to use social media to empower people. Developing a second-screen APP.

### **Hailey Chenevert, National Center for Science and Civic Engagement (NCSCE)**

AISL Project: Shaping an Infrastructure for the Partnership of Informal Science Education and Higher Education NSF# 1237463 <http://goo.gl/ieQHZi>

Promoting partnerships between higher ed and informal science learning institutions.

Looking for new funding to bring Twitter into the classroom, also interested in leveraging current science news for education

### **Janet Beissinger, University of Illinois at Chicago**

AISL Project: The Cryptoclub: Cryptography and Mathematics Afterschool and Online, NSF# 0840313 , <http://goo.gl/te4XcS>

Website where kids can apply cryptography

Interested in Digital Badges, particularly for our project leaders

Struggling with idea – that her leaders are not pushing the content as well as they could, but it does not trickle-down.

Have an ITEST grant built on the CryptoClub project, where kids will be making YouTube tutorials. NSF# 1311977 <http://goo.gl/ObjV65>

Kids are going to describe how they solved problems

Interested in how to use social media to crowd-source the evaluations; how to get kids to participate in that projects

### **Judy Brown, Patricia and Phillip Frost Museum of Science**

AISL Project: Children Investigating Science with Parents and Afterschool (CHISPA), NSF# 1323516 , <http://goo.gl/0zxP3P>

Judy Brown, Patricia and Phillip Frost Museum of Science. AISL Project: Children Investigating Science with Parents and Afterschool (CHISPA). 1323516. <http://goo.gl/0zxP3P>. AISL Project: Children Investigating Science with Parents and Afterschool (CHISPA) NSF# 1323516 - <http://goo.gl/0zxP3P>

SEPA Project: "Get in the Groove" <http://nihsepa.org/grants/get-groove>

Partners with the New York Hall of Science, University of Miami, to focus on health and nutrition for middle school girls. Girls use a virtual world space. Create a food truck in this virtual environment, creating avatars, ordering food for the food trucks... In the real world, 3-week summer program, wearing pedometers, monitoring healthy habits

Evaluation of impacts of a 3-D virtual environment in a museum setting

### **Karen Elinich, Franklin Institute Science Museum**

AISL Project: ARIEL: Augmented Reality for Interpretive and Experiential Learning, NSF# 0741659 , <http://goo.gl/pkcLv8>

Director of Science Content & Learning Technologies

Working with Orkan Telhan and Yasmin Kafai on Maker Spaces project: see

<http://www.orkantelhan.com/ecrafting/>

Engaged in learning research, just wrote a paper on models for making in family learning.

Interested in emerging technology in the museum, as place for learning. Just finishing up augmented reality project on installations around classic devices, in partnership with the U of PA. See article in October issue of Dimension: Augmented Hands-On Exhibits.

Co-PI – Tornado Alley large format film, research on data collection and data visualization.

Looking into Digital Badges: Mozilla's mission is to change the world; it's really ambitious. See <http://www.reconnectlearning.org/summit/> Connie Yowell's Opening Keynote.

Climate Change Education Partnership, using out of home media, like digital billboards to engage audiences. <http://goo.gl/I6GEEds>

Reference David Lustick's ScienceToGo project in Boston <http://goo.gl/inSAh4>

Conference: Learning on the Go: Using Out-of-Home Media to Communicate Climate Science <http://goo.gl/SXANwR>

### **Marnie Anbar – Tempe, AZ**

Visitor, no active AISL project.

Working with elementary school students. In spite of being in the best schools, they're not doing enough with science. Created a rec room for science and engineering play; students are aging out; want to make it sustainable

Modeled on husband's virtual network of astrobiologists - Blue Marble Space.org, and other comparable social media spaces.

Saganet.org – social media space – grassroots science education activities

Sagan Effect – the response of your colleagues is inversely proportional to the time you spend in public outreach

### **Miyoko Chu, Cornell University**

AISL Project: Crowd ID: Collaborative Tools Connecting People to Biodiversity through Social Networks and Machine Learning. 1010818. <http://goo.gl/gM2ZzC>

Work includes eBird database at Cornell, Birdcams – very active on social media

Merlin Bird ID software

Very interested in badging, was a finalist in the recent funding competition (Digital Media & Learning Competition) <http://goo.gl/iRHCOr>

### **Orkan Telhan, University of Pennsylvania**

AISL Project: Transforming STEM Competitions into Collaboratives: Developing eCrafting Collabs for Learning with Electronic Textiles NSF# 1238172 - <http://goo.gl/zL93M1>

See [www.ecrafting.org](http://www.ecrafting.org) An online portal, where people make objects, artifacts.

Challenge: Participants create artifacts at a science festival; we connect them to the website, but they don't come back to the site.

### **Robert Diaz de Villegas, WFSU-TV**

AISL Project: In the Grass, On the Reef: Understanding Linkages Between Coastal Ecology and Valued Ecosystem Services, NSF# 1161194 , <http://goo.gl/puCqEE>  
Under CRPA grant, produced web video series and blog. Looking for new approaches and more funding.

### **Robb Lindgren, University of Illinois**

AISL Project: Metaphor-based Learning of Physics Concepts Through Whole-body Interaction in a Mixed Reality Science Center Exhibit, NSF# 1114621 , <http://goo.gl/XP0rij>

Interested in interactive and immersive media, learners using their bodies inside of simulations; metaphor-based simulations – about how objects move in space...

Cues about how to move in a virtual space to demonstrate physical science principles

### **Sarah Cohn, Science Museum of Minnesota**

AISL Project: NISE - Nanoscale Informal Science Education Network  
Interested in audience research and uses of technology

### **Stephen Lyons, Moreno/Lyons Productions LLC**

AISL Project: The Mystery of Matter: Search for the Elements, NSF# 1010581 - <http://goo.gl/f7fiDi>  
Mystery of Matter is the people story behind the creation of the periodic table  
Outreach, Website, Teacher's Addition, creating teacher videos for chemistry teachers. Interested in web videos, impact of high quality content.

### **Sue Ann Heatherly, National Radio Astronomy Observatory**

AISL Project: Skynet Junior Scholars: Engaging Youth in Authentic Science Using Research Grade Robotic Telescopes, NSF# 1223345 , <http://goo.gl/TTFBjk>  
Skynet Junior Scholars – using robotic telescopes to do youth-directed projects, providing professional development to 180 4-H leaders and other informal science educators, and engage 1,400 middle school youth in using research-grade robotic telescopes and data analysis tools to explore the Universe.  
Communicating with youth is a challenge: How to manage COPPA restrictions?  
We have a Digital Badge, designed for Mozilla Open Badges.  
You have to do four online activities – take data with different exposures ties, explore filters, take a color image, design your own little investigation. Interested in meeting others doing similar work.

### **Theresa Horstman, University of Washington**

AISL Project: Badges for College Credit (BCC): Motivating Learning in Informal Science Programs Through a Digital Badge System, NSF# 1322512 , <http://goo.gl/X9uvQY>  
Specializes in games research and integrating games into learning  
Working with Science Centers to integrate a badge framework

## **Other Related Projects**

Below are other projects using media, which were not represented in the open space discussion, but are insightful examples of innovation in media applications. (They're listed by first name.)

Daniel Edelson, National Geographic Society. AISL Project: National Geographic FieldScope. 1010749.  
<http://goo.gl/PwNvWp>.

David Lustick, University of Massachusetts Lowell. AISL Project: Innovative Engagement: A Mass Transit Model for Informal Science Learning. 1223246. <http://goo.gl/vDsSB1>.

Amy Grack Nelson, Science Museum of Minnesota. AISL Project: Building Informal Science Education: Supporting Evaluation of Exhibitions and Programs with an informalscience.org Research Network. 1010924. <http://goo.gl/tNB3xw> .

Beth McGinnis-Cavanaugh , Springfield Technical Community College. AISL Project: Using Narrative in a Digital Learning Environment to Engage Children and Teens in Engineering. 1223460.  
<http://goo.gl/MNMSAb>

Christine Reich, Museum of Science, Boston. AISL Project: Creating Museum Media for Everyone [interactive exhibits for visitors with disabilities]. NSF# 1114549. <http://goo.gl/02t2Ft>

Geoff Schladow, University of California, Davis. AISL Project: 3D Visualization Tools for Enhancing Awareness, Understanding, and Stewardship of Freshwater Ecosystems NSF# 1114633  
<http://goo.gl/eZ0ixj>

Glenn Ellis, Smith College. AISL Project: Using Narrative in a Digital Learning Environment to Engage Children and Teens in Engineering. 1223868. <http://goo.gl/S8yl6J>.

James Harold, Space Science Institute. AISL Project: Making Space Social: Exploring the Educational Potential of the Facebook Social Network <http://goo.gl/CmOXOv> Starchitect game:  
<http://goo.gl/pEkOEr>

Janis Dickinson, Cornell University. AISL Project: The YardMap Network: Social Networking for Community Science NSF# 917487 - <http://goo.gl/hnCFuP>

Jason Brenneman-Black , Sue Ellen McCann, KQED. AISL Project: QUEST Beyond Local. 1223361.  
<http://goo.gl/pRdtmu>.

Nancy Bunt, Allegheny Intermediate Unit. AISL Project: Peg + Cat: Early Learning of Math through Media. 1323485. <http://goo.gl/9eBsk9>

Mary Ford, National Geographic Society. AISL Project: National Geographic FieldScope. 1010749.  
<http://goo.gl/PwNvWp>

Kari Kraus, University of Maryland. AISL Project: Advancing Informal STEM Learning Through Scientific Alternate Reality Games. 1323306. <http://goo.gl/106hgw>.

Lisa Leombruni, NOVA/WGBH. AISL Project: NOVA Making Stuff, Season Two. 1222986.  
<http://goo.gl/jFoiFK>

Joyce Ma, Exploratorium. AISL Project: An Indoor Positioning System for Informal Learning Experiences. 1346664. <http://goo.gl/6Bk2em>

Mary Nucci, Giant Screen Cinema Association. AISL Project: Setting the Agenda for Giant Screen Research. 1341016. <http://goo.gl/JM0Z1I>

Marisa Wolsky, WGBH. AISL Project: LOOP Production Season One Peep's World/El Mundo de Peep. 1222607. <http://goo.gl/P73zZd>

Teresa Chin, Youth Radio. AISL Project: NEXT: The Youth Radio Innovation Lab. 1323791.  
<http://goo.gl/Aq4smQ>

Timothy Carter, Butler University. AISL Project: Indianapolis as a Living Laboratory: Science Learning for Resilient Cities, NSF# 1323117 <http://goo.gl/bgXvL2>

Rhiannon Crain, Cornell University. AISL Project: The YardMap Network: Social Networking for Community Science. 917487. <http://goo.gl/hnCFuP>

Rita Karl, Twin Cities Public Television. AISL Project: SciGirls TV Series, Website, and Outreach - Season Two. 1114739. <http://goo.gl/J04ODn>

Patti Parson, PBS NewsHour. AISL Project: PBS NewsHour: STEM Learning for Adults, Teens, and At-Risk Populations. 1119253. <http://goo.gl/fDUags>

Pamela Rosenstein, NOVA/WGBH. AISL Project: NOVA Making Stuff, Season Two. 1222986. <http://goo.gl/kH3Vsj>

## Challenges

### **Challenges with the many platforms and technologies**

Managing COPPA compliance for children under 13

ADA Compliance

Digital Badges – how to implement; impact, use of Mozilla Open Badges

Finding resources to execute the technology – internal or external staff?

### **Marketing Challenges in social media “If you build it, will they come?” In a word... “No!”**

Uses of Twitter, Facebook, Instagram, Snapchat, Vine and other platforms

How to pick what technology to use; how does the choice of technology impact the audiences you reach and impact. Do the various pathways fragment the audience?

Creative uses of hashtags

### **Branding & Website URLs**

Finding a keyword that hasn't been used before

What do we call what we're doing?

Worked with a social marketing firm to explore the branding

### **Learning and Evaluation**

Analytics during game play traditional techniques

Surveys to infer improvements, correlated with user profiles

Embedded evaluation questions – do they work?

Use of traditional methods

### **NSF Policies related to these projects**

#### **Audiences, Preferences, and Access to Technology**

#### **Extending engagement beyond a single event**

Pluto Mission message – creating a digital message

Documentary of creating a “selfie of Earth”

Up to 100 megs  
“Ask the planet to evaluate the content”

### **Resources for Research: Pew Internet reports**

#### **A few final reference sites:**

scratch.mit.edu – programming language for children with rich online presence  
stackexchange.com – Many diverse Q&A sites based on Stack Overflow programming site  
edsurge.com – valuable newsletter on trends and innovations in educational technology  
audiojack.com – a community using sounds to tell a stories and learn