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**The Big Picture: Research and Trends in the ISE Field (A to Z)**  
**Informal Science Education Association of Texas Annual Conference**  
**February 19, 2015, Sky Ranch, Van Texas**  
**James Bell, Project Director, CAISE**



*Images courtesy of ISE PI Meeting 2012 attendees  
From left to right: Geoffrey Haines-Stiles; Mohini Patel Glanz, NWABR; Scot Osterweil; April Luehmann*

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[Evaluation landing page - http://informalscience.org/evaluation](http://informalscience.org/evaluation): newly redesigned for easier quicker access to evaluation-related resources

[Outreach for Scientists landing page - http://informalscience.org/about/informal-science-education/for-scientists](http://informalscience.org/about/informal-science-education/for-scientists): designed as an entry point to the collection of resources for research scientists, STEM professionals, directors of education/ education/engagement, broader impacts

[Research Agendas landing page - http://informalscience.org/research/research-agendas](http://informalscience.org/research/research-agendas): provides access to ISE research agenda development projects

[CAISE Perspectives Blog- http://informalscience.org/perspectives/blog](http://informalscience.org/perspectives/blog): offers an editorial approach to timely, important topics in the field linked to related resources in the repository

# ISE from A to Z

- **Activation Lab:** <http://www.activationlab.org/>
- **Active Prolonged Engagement:** [http://www.exploratorium.edu/vre/ape/ape\\_intro.html](http://www.exploratorium.edu/vre/ape/ape_intro.html)
- **ATIS (Assessment tools for IS[E]):** <http://www.pearweb.org/atis>
- **Broader Impacts:** <http://broaderimpacts.net/>
- **Citizen Science (Association!): The Culture of Science Engagement:** <http://citizenscienceassociation.org>
- **Designed-Based Implementation Research:** <http://researchandpractice.org/blogs/72>
- **Ecosystems (of STEM learning):** <http://www.samueli.org/stemconference/documents/stem%20learning%20ecosystems.pdf>
- **Evaluation:** <http://informalscience.org/evaluation>
- **FOCIS (Robert Tai's work):** [http://informalscience.org/images/research/RHTai\\_BlandySciTeacherWorkshop13\\_2014.pdf](http://informalscience.org/images/research/RHTai_BlandySciTeacherWorkshop13_2014.pdf)

# ISE from A to Z

- **Girls!** (NGCP): [http://www.informalscience.org/projects/ic-000-000-008-429/National\\_Girls\\_Collaborative\\_Project\\_Building\\_the\\_Capacity\\_of\\_STEM\\_Practitioners\\_to\\_Develop\\_a\\_Diverse\\_Workforce](http://www.informalscience.org/projects/ic-000-000-008-429/National_Girls_Collaborative_Project_Building_the_Capacity_of_STEM_Practitioners_to_Develop_a_Diverse_Workforce)
- **SHTEAM** (NEH+NEA+NSF): [http://informalscience.org/search/informal-commons?search=&search\\_url=http%3A%2F%2Fapi.informalscience.org%2Fsearch%2Fjson%3FsortDescendingBy%3DbeginDate%26fundingSource%3DNEH#topSearch](http://informalscience.org/search/informal-commons?search=&search_url=http%3A%2F%2Fapi.informalscience.org%2Fsearch%2Fjson%3FsortDescendingBy%3DbeginDate%26fundingSource%3DNEH#topSearch)
- **HowtoSmile**: [HowtoSmile.org](http://HowtoSmile.org)
- **International Year of Light**: <http://informalscience.org/perspectives/blog/year-of-light-informal-science-education-illuminating-resources-collection>
- **Kidzania**: <http://www.newyorker.com/magazine/2015/01/19/grow>
- **Khan Academy**: <https://www.khanacademy.org/> (thanks, Brooke!)
- **Libraries**: <http://informalscience.org/perspectives/blog/a-comprehensive-strategy-to-strengthen-stem-learning-must-include-libraries>
- **Living Laboratory** (MOS Boston): <http://www.mos.org/living-laboratory>
- **Learning Science in Informal Environments** (NAS/NRC): <http://informalscience.org/research/ic-000-000-002-024/LSIE>

# ISE from A to Z

- **Making!:** [http://makeshoppgh.com/wp-content/uploads/2015/02/MAKESHOP-Learning-Practices-formatted\\_FINAL\\_Feb-2015.pdf](http://makeshoppgh.com/wp-content/uploads/2015/02/MAKESHOP-Learning-Practices-formatted_FINAL_Feb-2015.pdf) and [http://informalscience.org/research/ic-000-000-002-029/Making\\_Meaning](http://informalscience.org/research/ic-000-000-002-029/Making_Meaning)
- **MOOCS:** <https://www.coursera.org/exploratorium> and <https://www.class-central.com/mooc/2161/coursera-learning-how-to-learn-powerful-mental-tools-to-help-you-master-tough-subjects>
- **MoMath:** <http://momath.org/>
- **Next Generation Science Standards:** [http://informalscience.org/research/ic-000-000-010-416/Guide\\_to\\_Implementing\\_the\\_Next\\_Generation\\_Science\\_Standards](http://informalscience.org/research/ic-000-000-010-416/Guide_to_Implementing_the_Next_Generation_Science_Standards)
- **Open Education Resources:** <http://www.sciencemag.org/content/341/6143/240.short#corresp-1>
- **Out of School STEM Learning Consensus Study (coming!):** <http://informalscience.org/perspectives/blog/workshop-on-out-of-school-stem-learning>
- **Portal to the Public:** <http://popnet.pacificsciencecenter.org/>
- **Q?rius:** <https://qrius.si.edu/>

# ISE from A to Z

- **Research+Practice Collaboratory:** <http://researchandpractice.org/>
- **SENCER:** <http://informalscience.org/projects/ic-000-000-000-987/SENCER-ISE: A Conference to Create Partnerships between Formal and Informal Science Educators to Advance STEM Learning through Civic Engagement>
- **Synergies:** <http://education.oregonstate.edu/synergies-parkrose-community>
- **Trellis:** <https://www.trellis-science.com>
- **University/Museum partnerships III (!):** <http://informalscience.org/perspectives/blog/next-generation-museum-university-partnerships>
- **The Informed Vision (Mind and Mechanism in Education chapter):** [http://books.google.com/books?id=iiTFxEeCrDIC&pg=PA19&source=gbs\\_toc\\_r&cad=4#v=onepage&q&f=false](http://books.google.com/books?id=iiTFxEeCrDIC&pg=PA19&source=gbs_toc_r&cad=4#v=onepage&q&f=false)
- **Wellcome Trust (Science Learning+):** <http://informalscience.org/science-learning-plus>
- **Xperience STEM:** <http://informalscience.org/perspectives/blog/x-stem-conference>
- **You Media:** <http://www.youmedia.org/>
- **Zoos & Aquaria! (CEC Research Agenda, ZAARC e.g.):** [http://informalscience.org/research/ic-000-000-010-061/AZA Framework for Zoo and Aquarium Social Science Research](http://informalscience.org/research/ic-000-000-010-061/AZA_Framework_for_Zoo_and_Aquarium_Social_Science_Research)

# Bilingual Exhibits Research Initiative (BERI)

- [http://informalscience.org/projects/ic-000-000-001-774/Bilingual\\_Exhibits\\_Research\\_Initiative\\_%28BERI%29](http://informalscience.org/projects/ic-000-000-001-774/Bilingual_Exhibits_Research_Initiative_%28BERI%29)
- Project studies Spanish-speaking visitors to explore aspects related to individuals, culture, social factors, and ISE setting
- San Diego Society of Natural History, Garibay Group, Miami Museum of Science, San Diego Natural History Museum
- Findings:
  - Code-switching is common
  - label-reading differs in bilingual groups
  - access to content in preferred language is more valued by adults in order to facilitate experience for children
  - presence of bilingual labels made visitors feel comfortable
  - Bilingual labels can help with language learning
  - Bilingual labels provide a connection to culture



## Survey of the Goals and Beliefs of Planetarium Professionals Regarding Program Design

- [http://informalscience.org/research/ic-000-000-008-814/Survey\\_of\\_the\\_Goals\\_and\\_Beliefs\\_of\\_Planetarium\\_Professionals](http://informalscience.org/research/ic-000-000-008-814/Survey_of_the_Goals_and_Beliefs_of_Planetarium_Professionals)
- Study of planetarium professionals about live interaction vs. passive programs, both for general audiences and when targeting elementary-aged children
- Authors from Arcadia University interviewed professionals attending regional planetarium conferences
- Findings:
  - Common goals for planetarium programs are to educate audiences about specific astronomical concepts and to increase interest in science
  - Live interaction is valued by the planetarium community, especially when working with children
  - Combining live and automated programming is common

# Great Lakes Teacher Badging Evaluation Report

- [http://informalscience.org/evaluation/ic-000-000-008-941/Great\\_Lakes\\_Teacher\\_Badging](http://informalscience.org/evaluation/ic-000-000-008-941/Great_Lakes_Teacher_Badging)
- Project introduced a teacher badging pilot program culminating in a Great Lakes Science Certified badge
- John G. Shedd Aquarium
- Pilot program was open to 221 participants. Data was collected through surveys, work product analysis, reflection, and conversation coding
- Findings:
  - Participants enhanced their competence teaching about the environment and science, integrating 21<sup>st</sup> century skills into their lessons
  - The concept of using badging for teacher professional development has been a successful strategy

## Milwaukee Public Museum's Ancient Worlds Gallery: Front-End & Formative Evaluation

- [http://informalscience.org/images/evaluation/Report\\_MPM\\_Ancient%20Worlds%20Evaluation\\_12-06-2012.pdf](http://informalscience.org/images/evaluation/Report_MPM_Ancient%20Worlds%20Evaluation_12-06-2012.pdf)
- Redesign of the Ancient Worlds Gallery at the Milwaukee Public Museum to create a more interactive visitor experience
- Study of adults in social groups who participated in semi-structured interviews to inform development
- Recommendations:
  - Incorporate information about civilizations worldwide
  - Explore dynamic concept of history
  - Make connections to the present
  - Design interactives to be adult-friendly
  - Enable visitors to filter content based on personal interests
  - Add an online social media component

# Final Report: Pathways to Brighter Futures Through STEM Careers

- [http://informalscience.org/images/evaluation/2013-12-23\\_Hispanic%20Communications%20Network%20STEM%20Pathways%20Final%20Report.pdf](http://informalscience.org/images/evaluation/2013-12-23_Hispanic%20Communications%20Network%20STEM%20Pathways%20Final%20Report.pdf)
- Project uses media activities, art activities, and flash mentoring with STEM role models while working with at-risk Hispanic youth in Santa Fe and Albuquerque, especially those who were currently or had been incarcerated
- Oregon State University, Hispanic Communications Network, Knight Williams
- Findings:
  - Video activities caused youth to think about STEM and STEM careers in a new way
  - Youth enjoyed the art activity, especially the component about looking to the future
  - Role model activities created a better understanding of what is involved in STEM careers, and more participants could see themselves working in a STEM career after the session than before

# Navigating the Future of Afterschool Science: Afterschool Science Networks Study Recommendations

- <http://www.sri.com/work/projects/afterschool-science-networks-study>
- [http://informalscience.org/research/ic-000-000-009-044/Learning\\_from\\_science](http://informalscience.org/research/ic-000-000-009-044/Learning_from_science)
- [http://informalscience.org/research/ic-000-000-010-008/Navigating\\_the\\_future\\_of\\_afterschool\\_science](http://informalscience.org/research/ic-000-000-010-008/Navigating_the_future_of_afterschool_science)
- Five-year, NSF-funded study of afterschool networks in CA by SRI International
- Recommendations for:
  - Afterschool program staff
  - Program administrators
  - Policymakers and funders
  - Researchers
- Specific recommendations:
  - Partner w/ science-specific organizations
  - Have staff person responsible for science content
  - Include staff who have background in science and/or youth development

# STEM Learning is Everywhere

- [http://informalscience.org/research/ic-000-000-009-276/STEM\\_Learning\\_Is\\_Everywhere](http://informalscience.org/research/ic-000-000-009-276/STEM_Learning_Is_Everywhere)
- Summary of meeting of informal learning educators, researchers, teachers, policymakers, advocates, etc.
- Reported produced by National Research Council
- More effectively integrate formal education w/ afterschool and other informal learning
- Recommendations for research, practice & policy to foster communication across sectors

# Cascading Influences: Long-Term Impacts of STEM Informal Experiences for Girls

- [http://informalscience.org/research/ic-000-000-008-414/Cascading\\_Influences](http://informalscience.org/research/ic-000-000-008-414/Cascading_Influences)
- Researcher-practitioner collaboration (OSU & Franklin Institute)
- Looked at 6 girl-serving programs w/ 5+ years of program history to see influence on:
  - STEM interest and career outcomes
  - Interest, engagement, participation in science hobbies/pursuits
  - Changes in perception of “who can do” science
- Three investigations of past participants
- Wide findings in common themes:
  - Memories of program experience
  - Personal identity and social capital
  - STEM learning

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**THANK YOU ISEA TEXAS!**

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