From Modest to Moonshot: What's Next for Museum R&D?

Jamie Bell	CAISE
Lisa Brahms	Children's Museum of Pittsburgh
Chip Lindsey	Children's Museum of Pittsburgh
Josh Gutwill	Exploratorium
Tom Rockwell	Exploratorium
Liz Kunz Kollmann	Museum of Science, Boston
Christine Reich	Museum of Science, Boston

ASTC
Toronto, ON, Canada
September 22, 2019

Session overview

- Briefly define Museum R&D
- Motivate the session — why are we here?
- Present R&D plans from CAISE and 3 museums
- Generate and share new R&D ideas together
- Record our ideas for posting by CAISE

What is Museum R&D?

Focus: Visitor Experience / Learning

Research

Research with Development

Learning from Practice

R&D is a way for us to learn

- Improve specific exhibits or programs

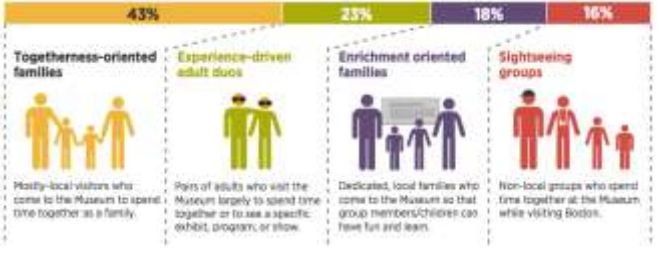
How can this design be optimized?

R&D is a way for us to learn

- Improve specific exhibits or programs
- Develop Institutional understanding

How does Productive Struggle affect learning?

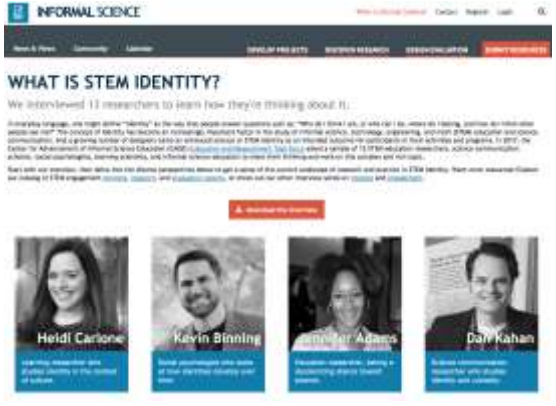
What are our Audience Segments?



R&D is a way for us to learn

- Improve specific exhibits or programs
- Develop Institutional understanding
- Field-wide knowledge

What is STEM Identity?



Which exhibit designs engage girls?

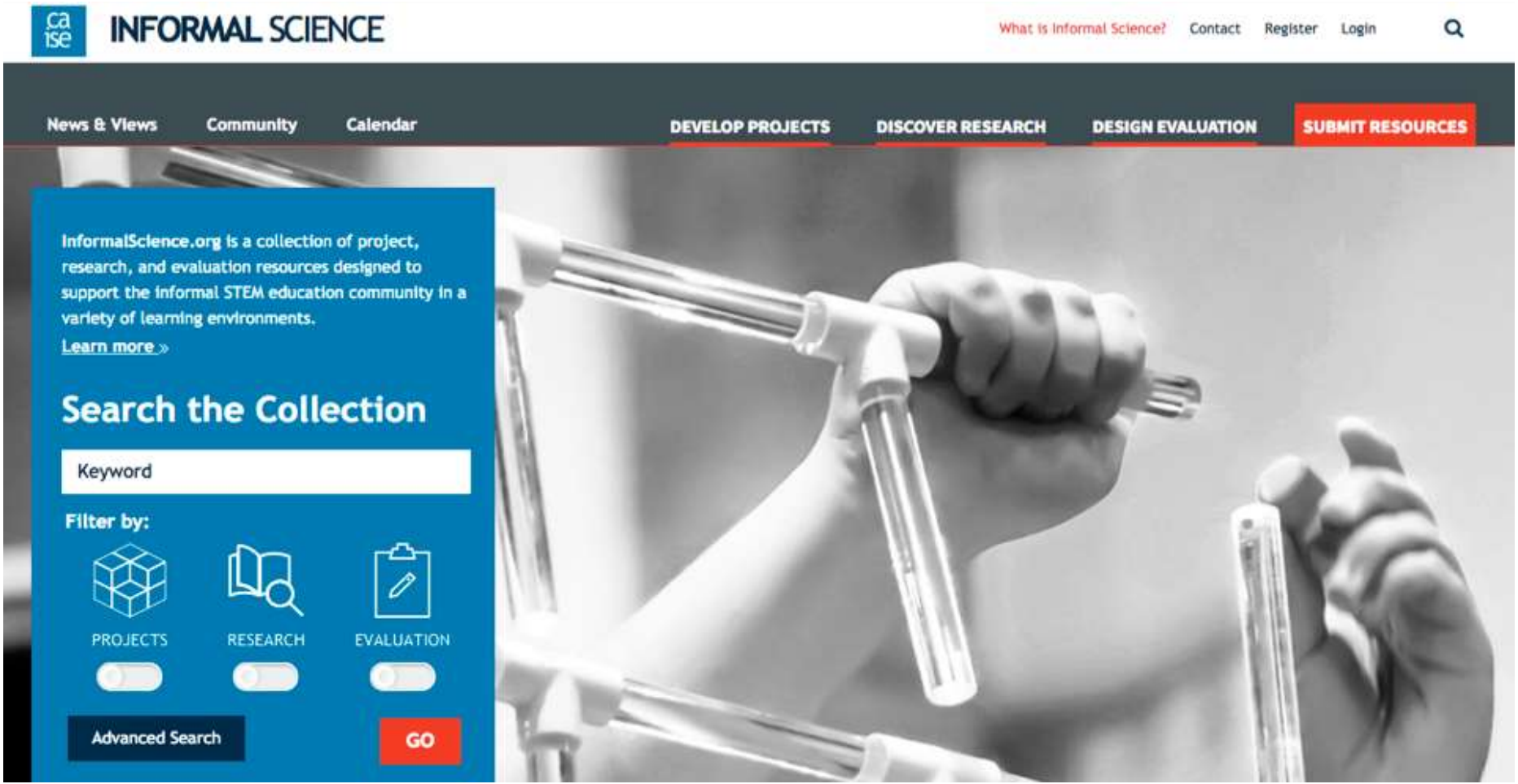
Share R&D Topics

caise | center for advancement of informal science education — Jamie Bell

children's museum pittsburgh | museumlab — Lisa Brahms & Chip Lindsey

Museum of Science — Liz Kunz-Kollmann & Christine Reich

exploratorium® — Tom Rockwell (& Josh Gutwill)


INFORMAL SCIENCE
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InformalScience.org is a collection of project, research, and evaluation resources designed to support the informal STEM education community in a variety of learning environments.
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Any opinions, findings, and conclusions or recommendations expressed are those of the speakers and do not necessarily reflect the views of NSF.

Sample of current NSF AISL-Funded Museum R & D (2019)

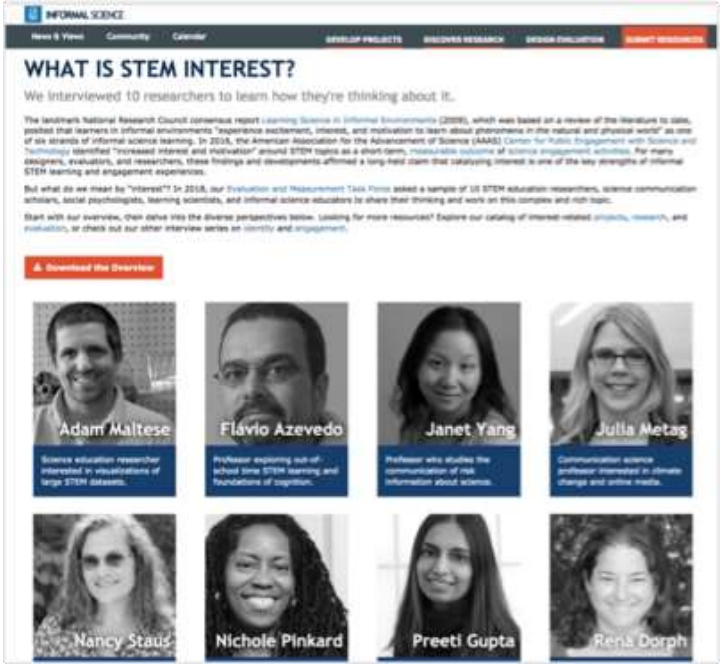
- **Audiences:** Latinx, American Indian, Alaska Native, early learners, families, older adults, girls, people with disabilities, women transitioning from the justice system
- **Youth:** career awareness, best practice for outcomes, longitudinal impact
- **STEM topics:** water, ocean literacy, snow, light, exoplanets, food, engineering, robotics, imagination
- **Approaches/settings:** making and tinkering spaces, exhibits, podcasts, STEAM, non-science-related art, planetarium shows
- **Constructs/theory:** intersectional identity, resilience, cultural competence, inclusivity, authenticity, constructivism, DBR & DBIR

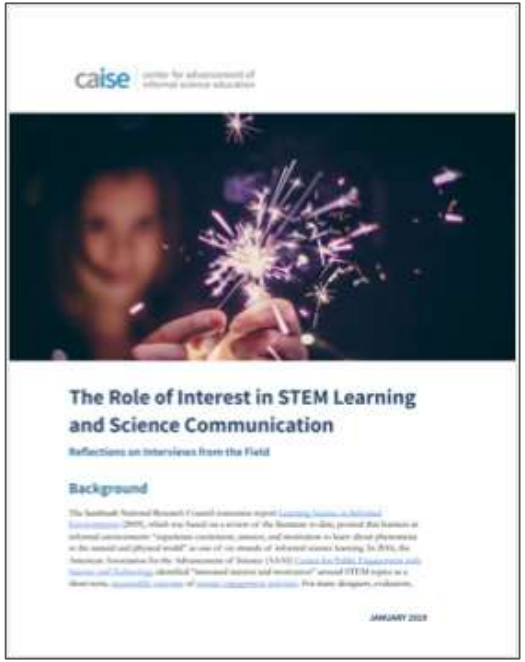
What is STEM Identity, Interest, & Engagement?

35 experts share their projects, perspectives, resources, and advice related to how these phenomena show up with diverse audiences in different contexts.

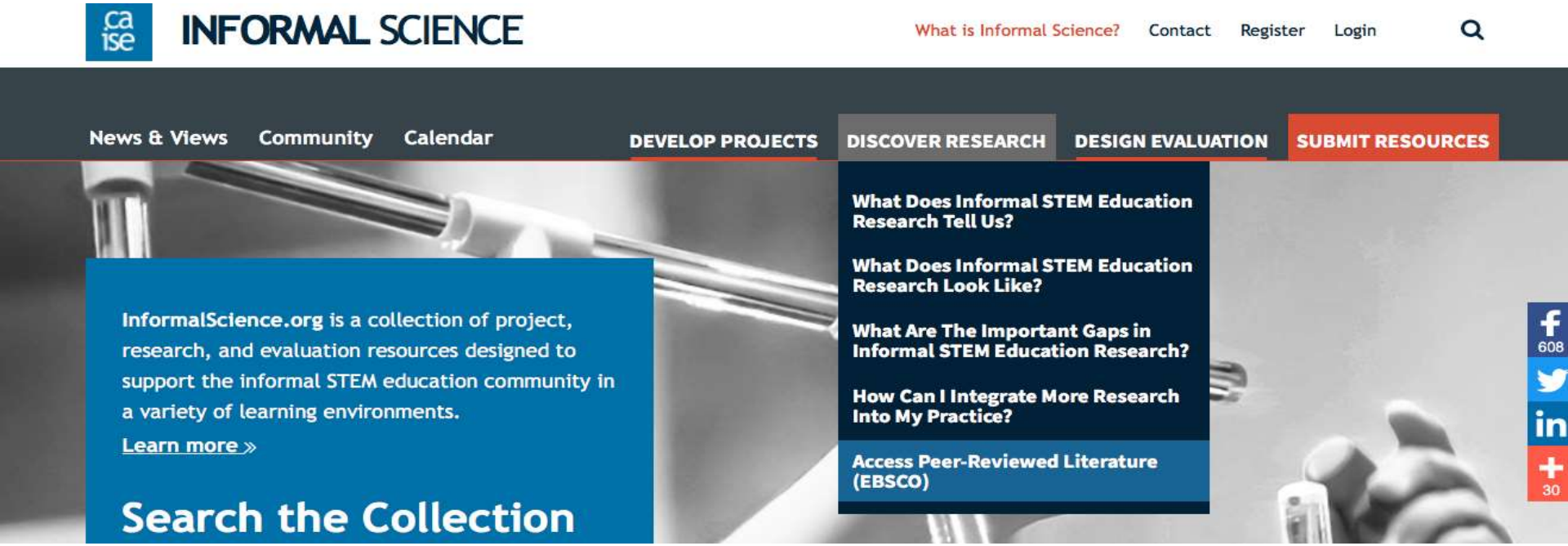
Explore the resources:

http://bit.ly/eval-measure





informalscience.org/interest



Accessing Peer-Reviewed Literature on EBSCO

Full text of more than 2,000 peer-reviewed journals like *Curator: The Museum Journal*, *Science Education*, *Cultural Studies of Science Education*, and *Science Communication*.

Monthly newsletter @informalscience /informalscience

Thank You

caise INFORMALSCIENCE.COM

How do we create the conditions to **notice** opportunities for learning?

children's museum pittsburgh

museumlab

How do we create the conditions to **notice** document, reflect, respond and design to support opportunities for learning?

children's museum pittsburgh

museumlab

values-based
reflective
practice
MAKESHOP
childrens
museum
pittsburgh

MAKESHOP® learning practices

The *Learning Practices of Making* is an empirically identified framework that describes observable behaviors of learners in MAKESHOP, the makerspace at Children's Museum of Pittsburgh. These practices capture the learning objectives that we value and design to support.

LEARNING PRACTICE	PRACTICE DESCRIPTION
INQUIRE	Learners' openness and curious approach to the possibilities of the context through exploration and questioning of its material properties.
tinker	Learners' purposeful play, testing, risk taking, and evaluation of the properties of materials, tools, and processes.
seek & share resources	Learners' identification, pursuit, and sharing of expertise with others; includes collaboration and recognition of one's own not-knowing and desire to learn.
hack & repurpose	Learners' harnessing and salvaging of materials, tools and processes to modify, enhance, or create a new product or process; includes disassociating object property from familiar use.
express intention	Learners' discovery, evolution, and refinement of personal identity and interest areas through determination of short and long term goals; includes learners' responsive choice, negotiation, and pursuit of goals alone and with others.
DEVELOP FLUENCY	Learners' development of comfort and competence with diverse tools, materials, and processes; developing craft.
SIMPLIFY to complexify	Learners' demonstration of understanding of materials and processes by connecting and combining component elements to make new meaning.

values-based reflective practice

children's museum

small bets methodology

small bets methodology

museumlab

small bets methodology

children's
museum
pittsburgh
social emotional learning

Museum of Science®

From modest to moonshot: What's next for museum R&D?

2019 ASTC Conference

Toronto, ON, Canada

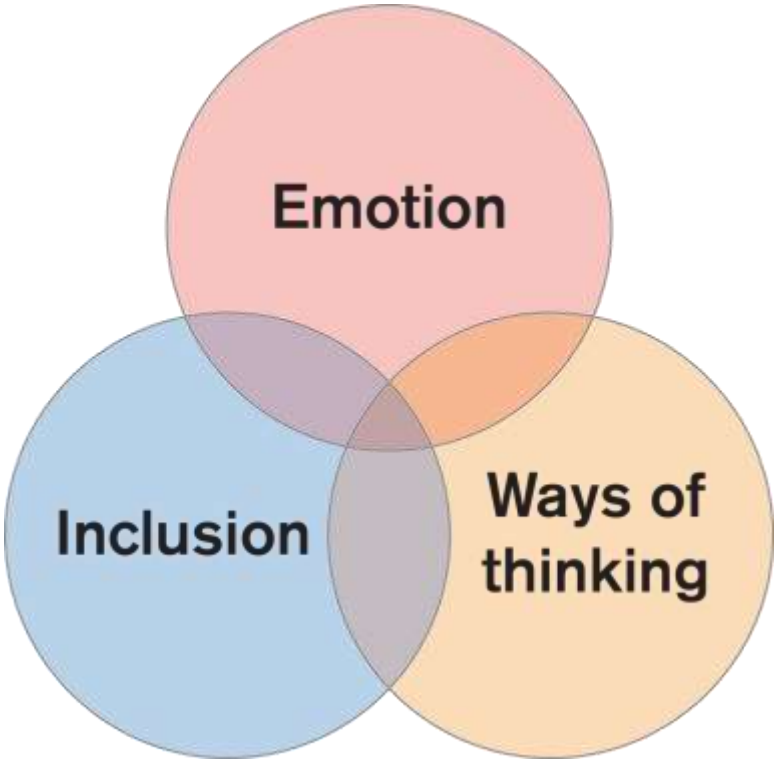
Christine Reich and Elizabeth Kunz Kollmann

September 22, 2019

Overarching goal

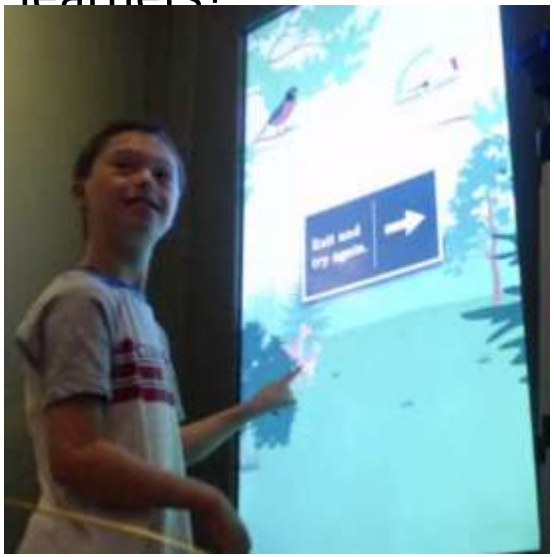
Excite, empower, and engage everyone to be the thinkers and innovators needed to shape our future

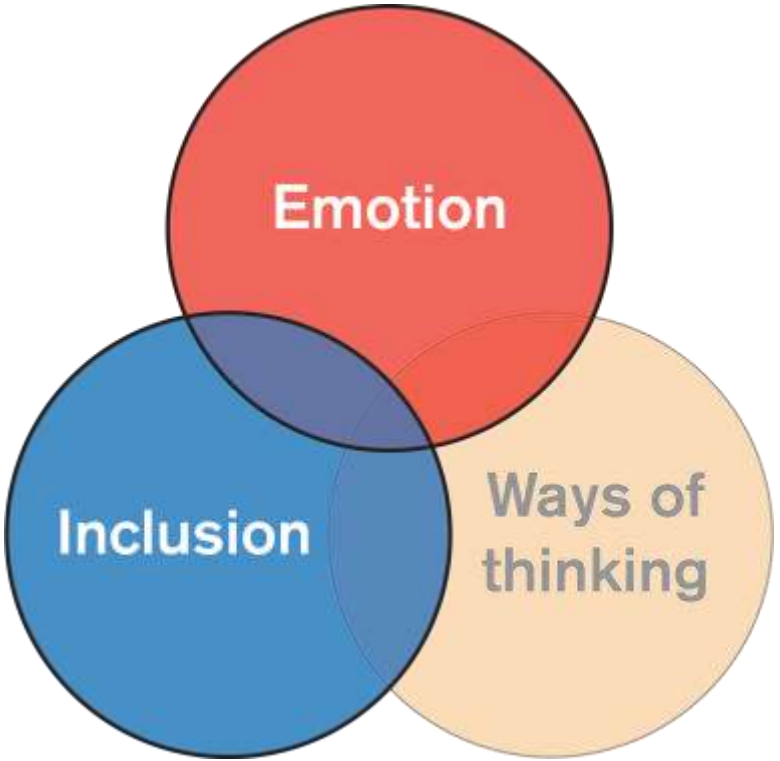
How do we empower everyone to leverage STEM ways of thinking and take action to shape a better future?



How do we empower everyone to leverage STEM ways of thinking and take action to shape a better future?

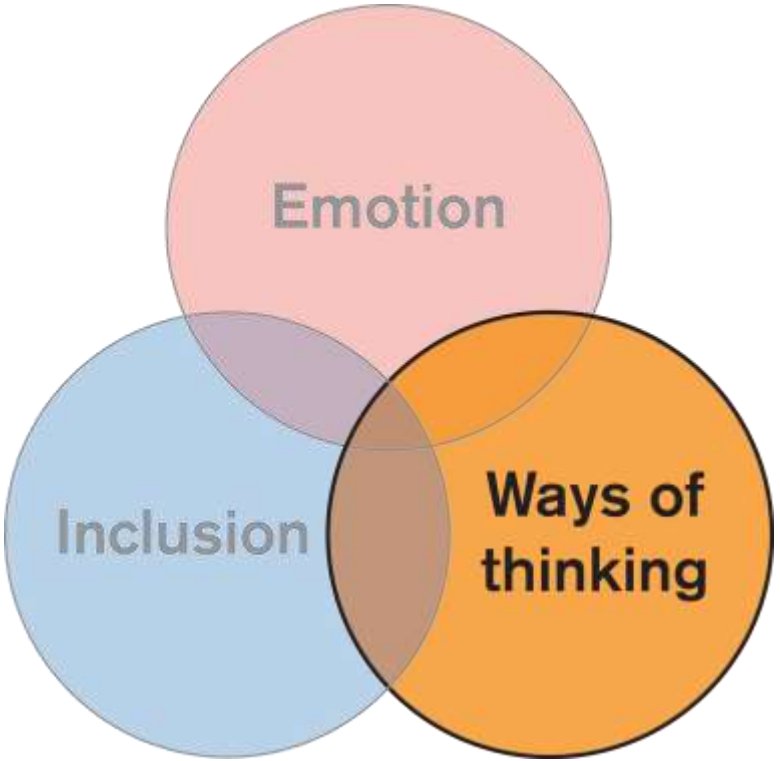
How do we empower everyone to see themselves as STEM learners?





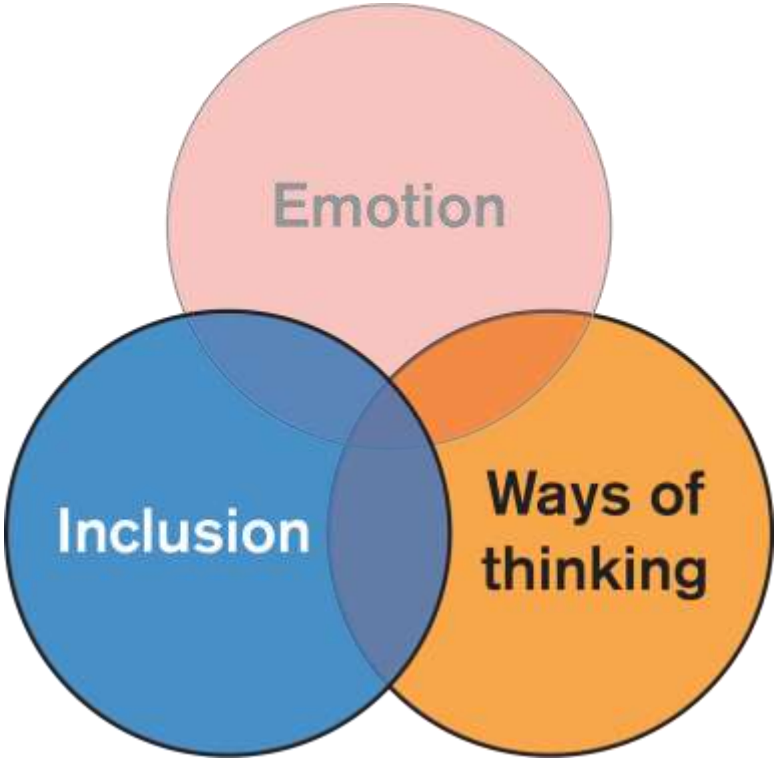
How do we empower everyone to leverage STEM ways of thinking and take action to shape a better future?

How do we leverage STEM ways of thinking to imagine a better future?



How do we empower everyone to leverage STEM ways of thinking and take action to shape a better future?

How do we create STEM experiences where everyone feels supported to learn?



Thank you

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The Exploratorium R&D Agenda
A Focus for Our Future

From Modest to Moonshot: What's Next for Museum R&D?

ASTC, September 22, 2019

EXIT

The R&D Agenda expresses our organization’s learning intentions and provides direction to help us prioritize our activities over the next few years.

Advancing Inquiry:

Broadening and Deepening Inquiry-Based Learning Experiences

Advancing Inquiry

What new topics and new modalities of engagement beyond phenomena-based interactive exhibitry, successfully compel people to think more critically?

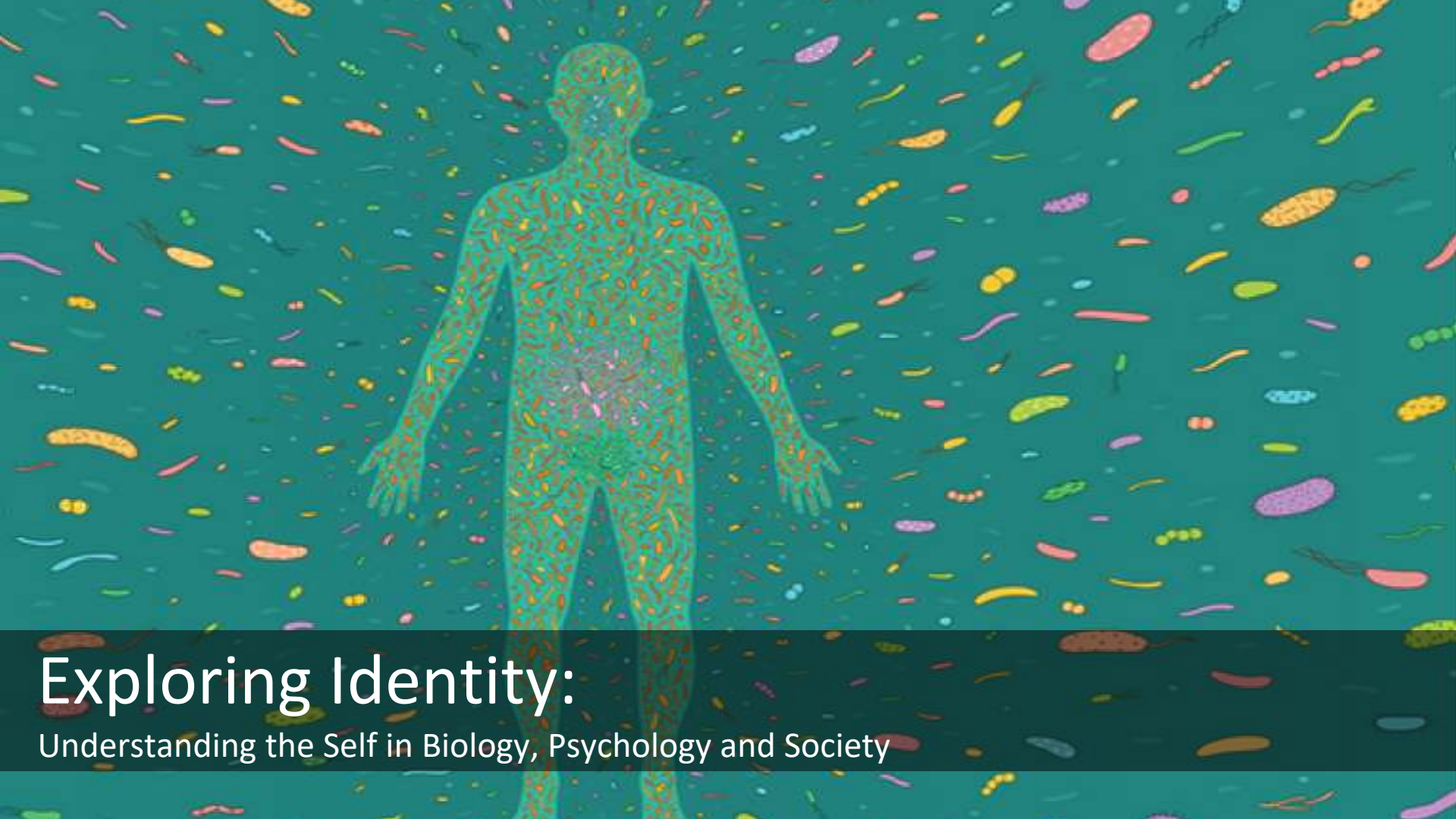
How can we inspire people to go deeper in their line of inquiry—seeing a thought through from initial idea to evaluating evidence to interpreting outcomes?

What new professional learning practices lead to greater reach, new audiences, and innovative partnerships?

Living Liquid

ELL & Science

STEAM Starters



Exploring Identity:

Understanding the Self in Biology, Psychology and Society

Exploring Identity

What new scientific phenomena and designed interactions enable people to expand the way they understand overlapping biological and social selves?

How can informal learning experiences centered on the role of social identity illuminate inequities and advance social justice?

How can we develop our practices to be more welcoming, representative, and just toward diverse audiences and collaborations?

Cells to Self

Self, Made

Middle Ground

Engaging Ecology:

Expanding Place-Based Environmental Pedagogies

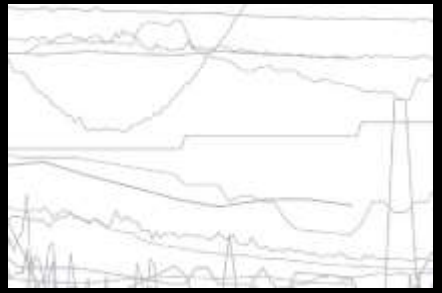
Engaging Ecology

What communication strategies catalyze people to be more open, engaged, and positive in response to environmental issues?

What tools can we build to enable public and professional audiences to become change agents and successful collaborators addressing the most pressing environmental issues of our times?

What new professional learning practices lead to greater reach, new audiences, and innovative partnerships?

Instrumenting the Landscape



Wired Pier

Conversations about Landscape

Fostering Civic Agency:

Enabling Individuals to Impact Their Physical and Social World

Fostering Civic Agency

How do we identify, convene, learn from, and inspire different groups of people—policy- makers, scientists, artists, community members, etc.—to collaboratively envision and construct a mutually beneficial and just society?

How do we learn from and support diverse communities in inclusive and welcoming ways that inspires open-minded learning, thinking, dialogue, and decision-making skills?

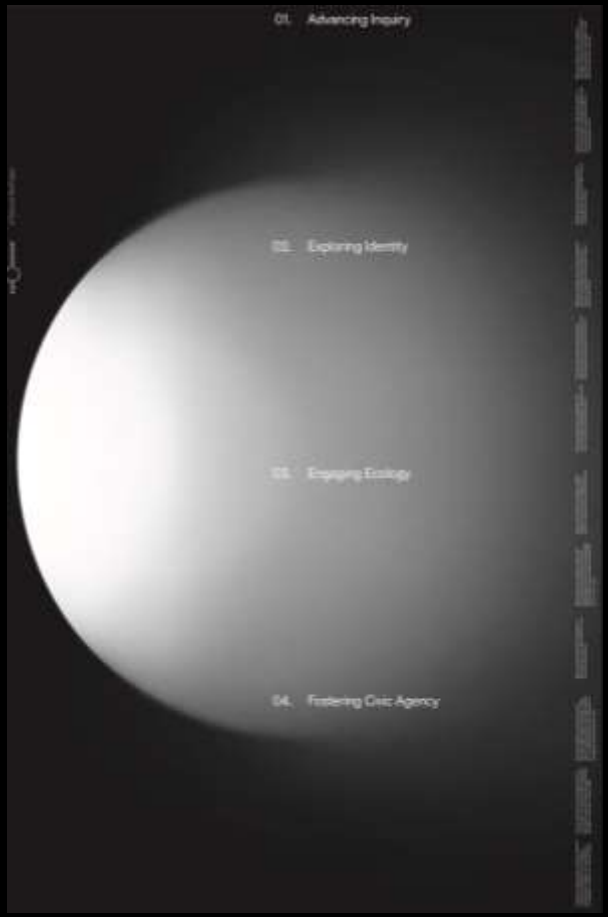
How do we measure and assess how effective our different strategies are in instilling a greater sense of agency in individuals and accessibility in institutions to affect change?

Resilience by Design

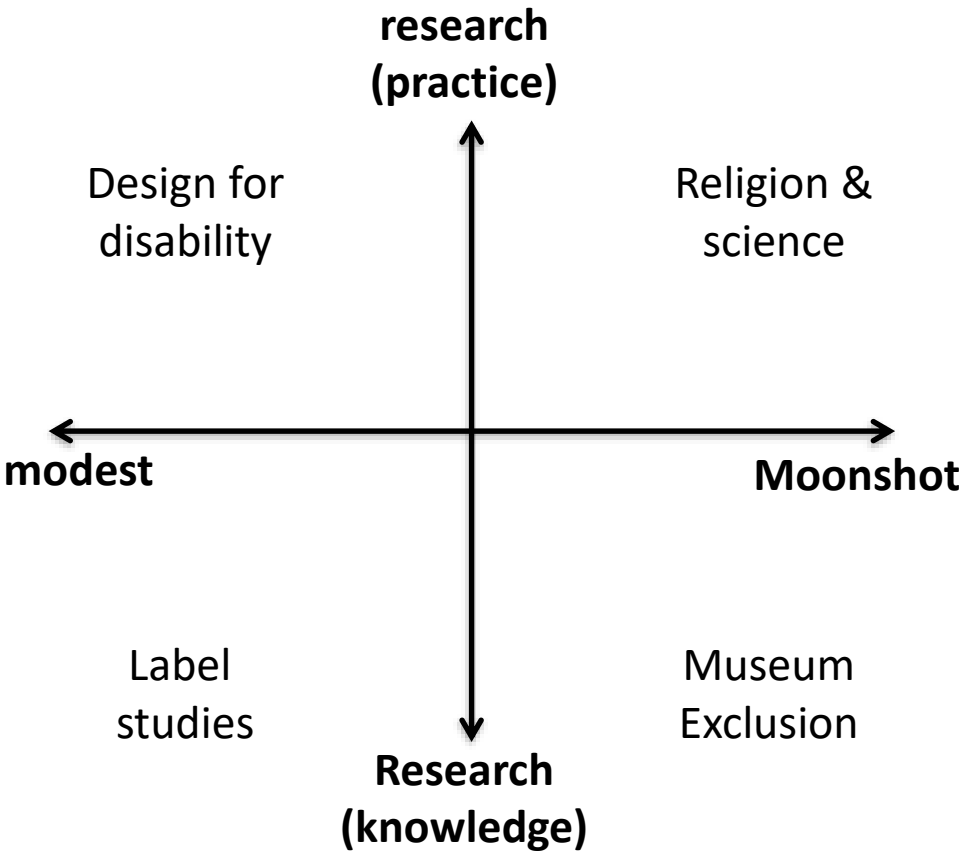
Buchanan Mall

Emergent Adult Learners

Summary Document



Generate new ideas

- R&D Questions
  - Your institution is pursuing
  - You'd like to pursue
  - You'd like someone to pursue

Categorize new ideas