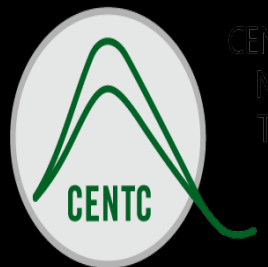# Collaborative Center Networks & Large Facilities

Monya Ruffin, PhD, CCHF Director of Education, Outreach & Diversity
William Katzman, LIGO – SEC Program Leader
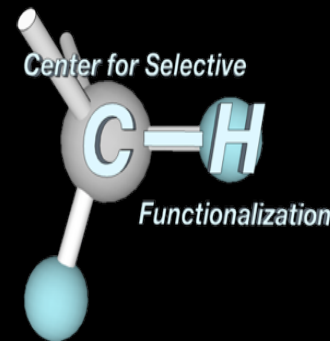
# NSF Centers for Chemical Innovation (CCIs)

CENTC I Eve Perara, PhD
CCI Solar I Michelle DeBoever

CaSTL I Lauren Shea
CCE I Christopher Parsons

CSMC I Andy Bedingfield
CCHF I Monya Ruffin

CAICE I Becky Hames
CSP I Jennifer Henderson

**LIGO:** Laser Interferometer Gravitational Wave Observatory – looking for ripples in space-time caused by exploding stars, colliding black holes, etc. (never directly seen)
Consists of two labs, plus the two university labs (Caltech, MIT) plus a loose-knit contingent of over 900 scientists/engineers world-wide. I work at one lab on Education & Public Outreach

# Broader Impacts - Informal Learning

**What are Informal learning experiences?**

- **Low Risk** (you can't fail)

- **High Choice** (user determines whether to engage)

# Broader Impacts - Informal Learning Scope of Work

## Activities

School Field Trips /Tours
After School Activities /School Clubs
Open Days for the Public / Tours
Outreach with local entities (Science Museum, etc.)
Museum Exhibits
Radio, TV, Films
Websites
Computer games or apps (i.e., black hole pong)
Social Media (i.e., Reddit, Facebook, Twitter)
Science Cafes/Talks
Science Festivals
Teacher Professional Development (Not ILE)

## Factors When Choosing

- Evaluation/Research
- Staffing – dedicated, volunteer, drafted
- Technology / Instrumentation vs. results vs. science
- Goals, Goals, Goals!!!

# Center & Large Facility Education & Outreach (ISE) Leaders

- Initiate and or coordinate EO/ISE efforts at the parent institution and across academic & industrial partner sites - **PROGRAMMING**

- Develop partnerships and collaborations with various entities and stakeholders that align with the Center's EO mission and goals - **PARTNERSHIPS**

- Communicate the Center's research and opportunities to diverse audiences (i.e., scientific/non-scientific communities) using various platforms and methods - **COMMUNICATION**

- Evaluate and or work with an external evaluator to ensure that EO/ISE efforts are monitored, tracked, and assessed (i.e., formative, summative) - **EVALUATION**

# Programming: ISE Broader Impacts

**Activities**

- *Research Programs*

*Informal*

- Professional Development (i.e., outreach activities, speaker series, workshops,)

- K-12 Teachers & Students (i.e., during school, afterschool, summer enrichment, toolkits, curriculum)

- Public Engagement (i.e., Science Cafés, Science Festivals, Exhibits, Arts programs, Radio)

# Programming - Knowns

## Knowns

- Research centers are often less comfortable/experienced engaging within informal contexts. More comfortable/experienced engaging with the scientific community

- Centers are successfully developing and implementing effective programs

- Engagement in Center EOD/EO programming can be mutually beneficial and have broader impacts for all involved (i.e., science communication)

- Opportunities beget opportunities (i.e., ISE supplements)

- Time & resource investment can be significant

# Programming – Needs/Opportunities



**Needs/Opportunities**

- Center-wide engagement

- More opportunities for "opportunities to beget opportunities" --- leverage expertise, resources, and new ideas

- Broadening participation

# Partnerships: ISE Broader Impacts



**Activities**

- Internal Center academic & institutional partnerships

- National Organizations

- K-12 schools & programs (formal/informal)

- ISE Institutions & Organizations

  - Science Centers, Museums, Radio/TV/Film, Science Festivals, Botanical Gardens, Science Café Orgs/Groups

- Local partnerships

# Partnerships – Knowns & Needs/ Opportunities

## Knowns

- The ultimate mission and goals of the Centers and ISE orgs are often the same

- The scientific research community and ISE community speak different languages

- Opportunities beget opportunities  (i.e., **ISE supplements**)

## Needs/Opportunities

- Better connect Centers and ISE organizations with synergistic interests

- Better leverage expertise, resources, and new ideas

- Share best practices and broader impact results from successful models

# Communication: ISE Broader Impacts

## Activities

- Phone, Email, & Videoconferences

- Websites

- Social Media

- Publications (i.e., flyers, newsletters, magazines, etc.)

- Face-to-Face (i.e. conferences, events, etc.)

- Radio/TV/Film

- Communicating Science Workshops, Training, and Fellowships

# Communication - Knowns

## Knowns

- Multiple approaches and platforms are needed to effectively communicate Center efforts

- Communicating Center's high level research effectively and appropriately to the various audiences can be challenging

- Some communication strategies are more effective than others

## Needs/ Opportunities

- Learn more about potential resources and opportunities that might enhance Center communication efforts

- Partner with various stakeholders and entities to provide science communication training and opportunities for research & opportunities dissemination

- Explore strategies for assessing broader impacts communication efforts & impact



# 9543

LITERATURE

TEXT BOOK

"Just think of it as if you're reading a long text message."

# Evaluation

**Activities**

- Internal Evaluation & External Evaluation

  - Formative & Summative

    - surveys, interviews, web analytics

# Evaluation

## Knowns

- Centers are using evaluation data to assess, inform, and determine the impact and success of their programs.

- Developing and implementing appropriate evaluative measures can be challenging

- Motivating others to evaluate their activities can be difficult but is needed to fully assess program success.

## Needs/Opportunities

- Partner with experienced evaluators, especially those with informal science education evaluation expertise

- Advance the field by sharing evaluative findings more broadly (i.e., publications, CAISE, etc.)

# Public Considerations

**You're spending tax money on what? (Justifying our Existence)**

- Research bringing unknown benefits (GPS, supermarket checkouts)

- Pushing Technology

- Education & Outreach

**You mentioned the big bang and 60 million light years, how could that be when the universe is just 10,000 years old?**

- Respecting people's voices, you respect theirs, they respect yours.

- You rarely change the opinion of someone through analysis alone.

# Public Considerations

**How to do interesting yet related activities that engage different audiences & work**

- Utilizing partner resources

- Creating new resources

- Utilizing website resources

- *Occasional difficulties keeping exotic topics connected,*

- *Unsure of exactly which methods are best for particular objectives*

**How to create & cultivate collaborations**

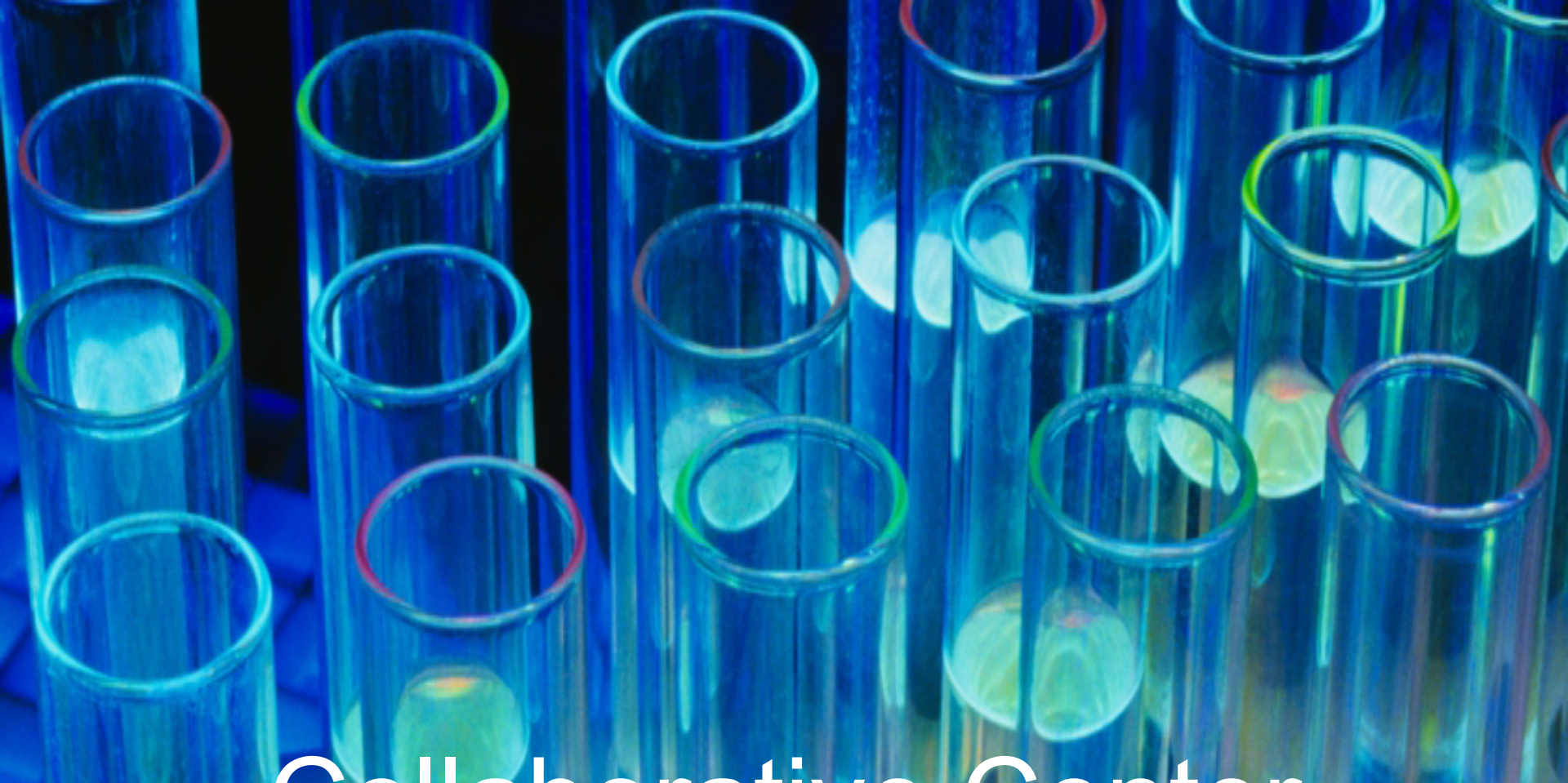- Foster Win-win scenarios

- *Keep things fresh & reflective*

# Lingering Issues

**Tensions:  Inspiring Awe vs. Encouraging Scientists**

- How do we balance the need to impress with the need to educate?

- How do we inspire confidence for the funders while at the same time show how there are still questions to be answered for the budding scientist?

**PRIORITIZING RESOURCE ALLOCATION: "bang for the buck" based upon our goals (resources include dollars and staff time)**

- Defining the priority of our goals

- Understanding relative effectiveness per goal per activity (we do evaluation but...)

- Do we preach to the interested or seek out those who might become interested?  (Increasing diversity versus nurturing existing pipelines)

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