STEM Learning and Research (STELAR) Center @ Education Development Center

Smart and Connected Communities: An ITEST Perspective

Thursday January 21, 2016

stelar
STEM Learning and Research Center

NSF

EDC Learning transforms lives.

Agenda

- Introduction
- Smart and Connected Communities: A description
- Two Projects: Looking Toward Smart and Connected Communities
  - *Curriculum + Community Enterprise for Restoration Science in New York Harbor*
  - *STUDIO: Build Our World: A University-Community Collaboration to Support Low-Income and Immigrant Youth in STEM*
- Smart and Connected Communities across NSF's EHR

Who We Are

- STEM Learning & Research Center (STELAR)
- Education Development Center
- Supporting the program and its grantees since 2003
- Available to assist considering submitting an ITEST proposal
- http//:stelar.edc.org

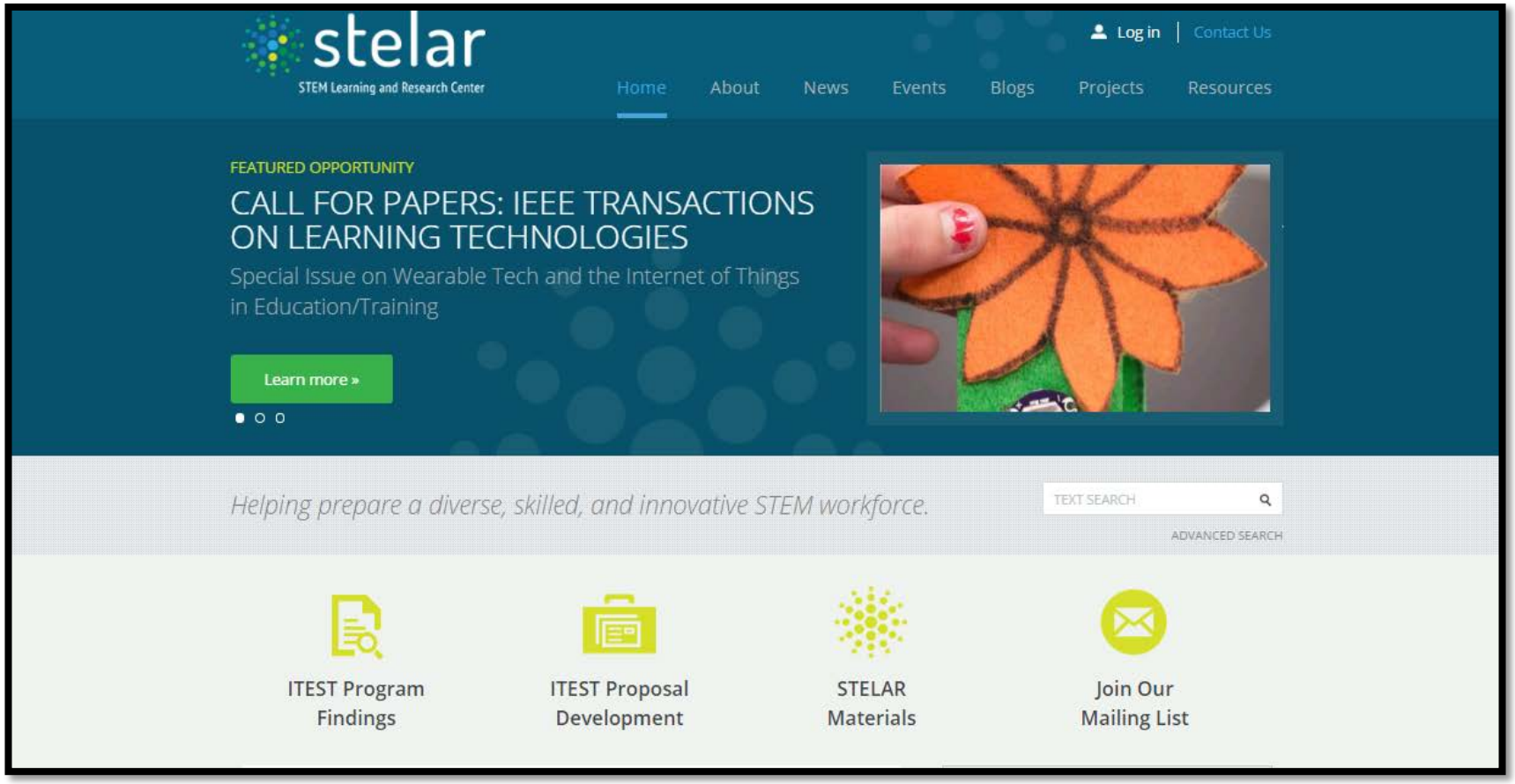
What We Do

- Facilitate projects' success through **technical support** with a focus on synthesis of findings
- Inform and influence the field of STEM stakeholders by **disseminating** project findings nationally
- Deepen the impact and reach of the ITEST program by **broadening participation** in the ITEST portfolio

Some of Our Activities

- **Webinars:** Effective Dissemination, Designing Research for ITEST Projects, Mentoring Models
- **Monthly Newsletter:** Information to stay updated on all things STEM and ITEST
- **Project Liaisons:** A STELAR staffer who works directly with each project to provide resources and make connections
- **Regional and Thematic Meetings:** A way for current projects to network with each other
- **Management Information System (MIS):** Annual collection of project information about what projects do, who they work with, what they have achieved

Find Resources on STELAR Website



Get Ideas for Designing ITEST Proposals

ITEST Proposal Development

Share / Save

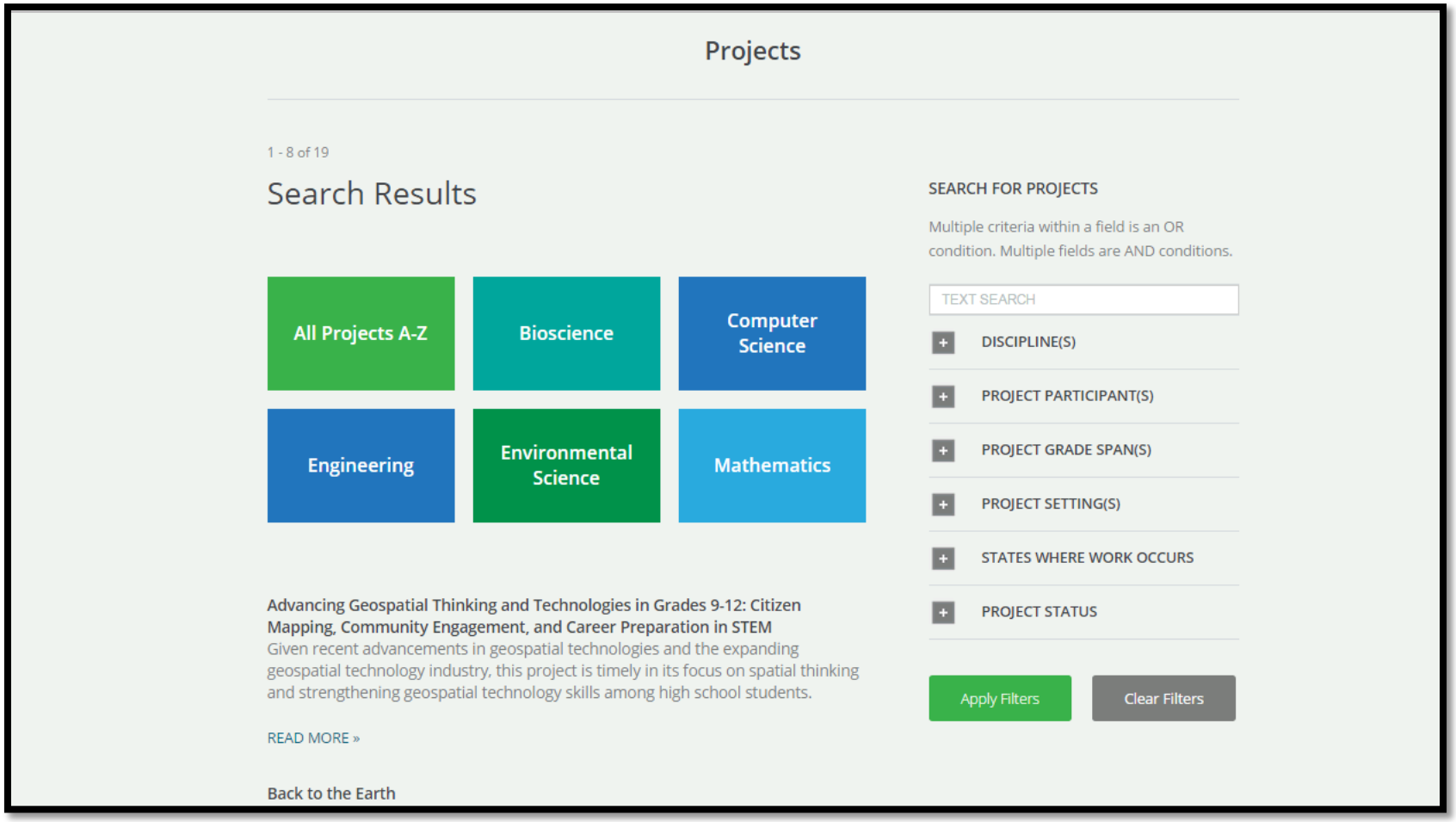
Are you considering submitting a proposal to ITEST? You have come to the right place!
The resources under each heading below provide valuable information to help you develop a competitive proposal:

- The ITEST solicitation webinars provide an overview of the ITEST program as well as details on what to include, and what not to include, in your proposal.
- STELAR themed webinars demonstrate how previous ITEST projects have tackled topics that are of interest to the ITEST program.
- Data and Info Briefs are publications that summarize the activities of the ITEST projects in a given year. Knowing what has been done previously may help you develop an innovative proposal.
- Other publications provide background information on topics that are of interest to the ITEST program.

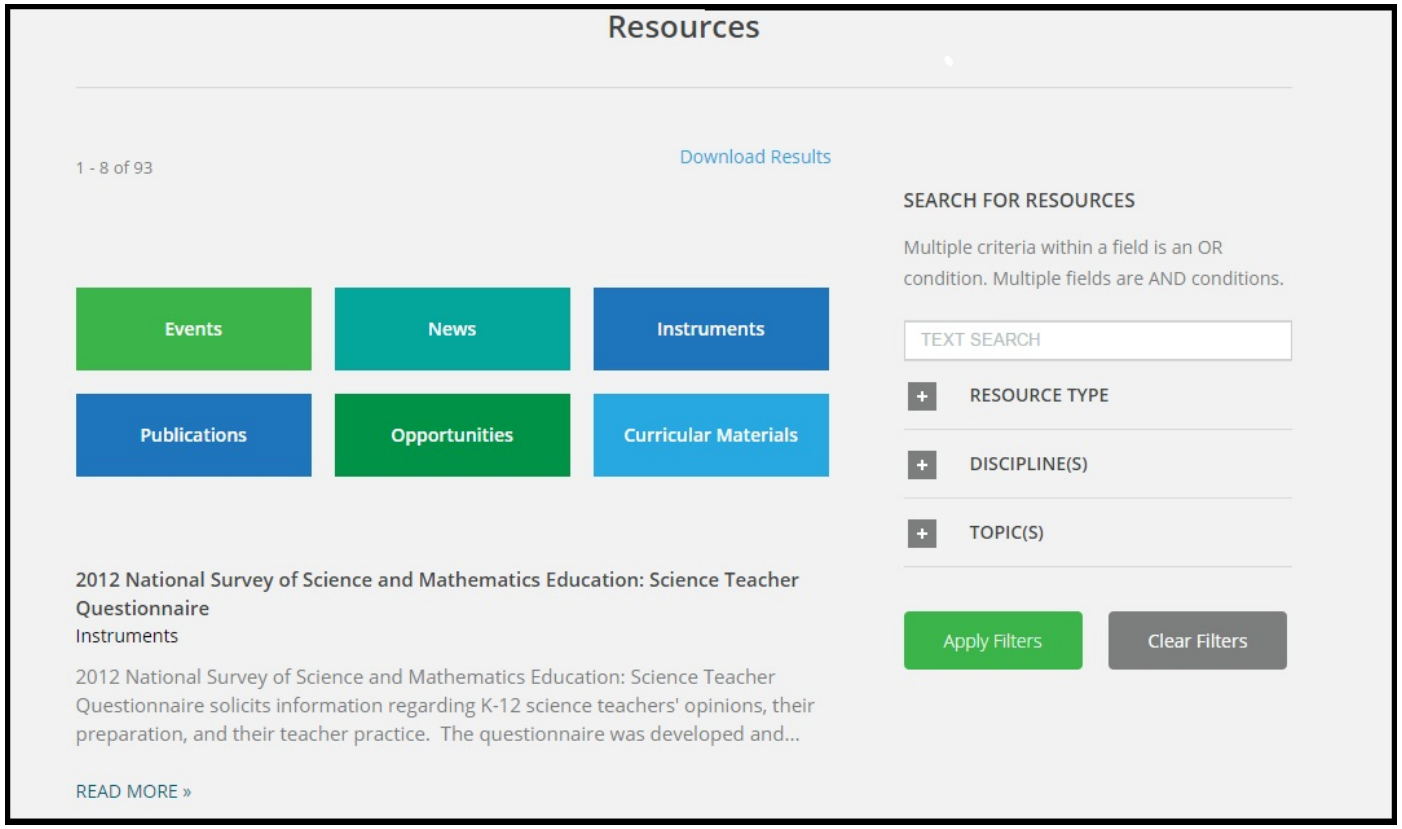
In addition, we suggest you also peruse the other areas of the STELAR website to learn more about your specific area of interest. We encourage you to browse the project profiles to see what projects have already been funded; read ITEST Program Findings to discover what the previously funded ITEST projects have learned from their research and implementation efforts; and search within resources to find *instruments* and *curricular materials* used and developed by ITEST projects.

- GET TO KNOW ITEST
- PREPARE YOUR PROPOSAL FOR SUBMISSION
- DEVELOP A ROBUST RESEARCH DESIGN
- CREATE AN EFFECTIVE EVALUATION STRATEGY
- CONNECT WITH PARTNERS
- REACH UNDERSERVED POPULATIONS
- DEVELOP THE WORKFORCE OF THE FUTURE

Find Project Profiles



Resource Library – Publications, Curricular Materials & Instruments

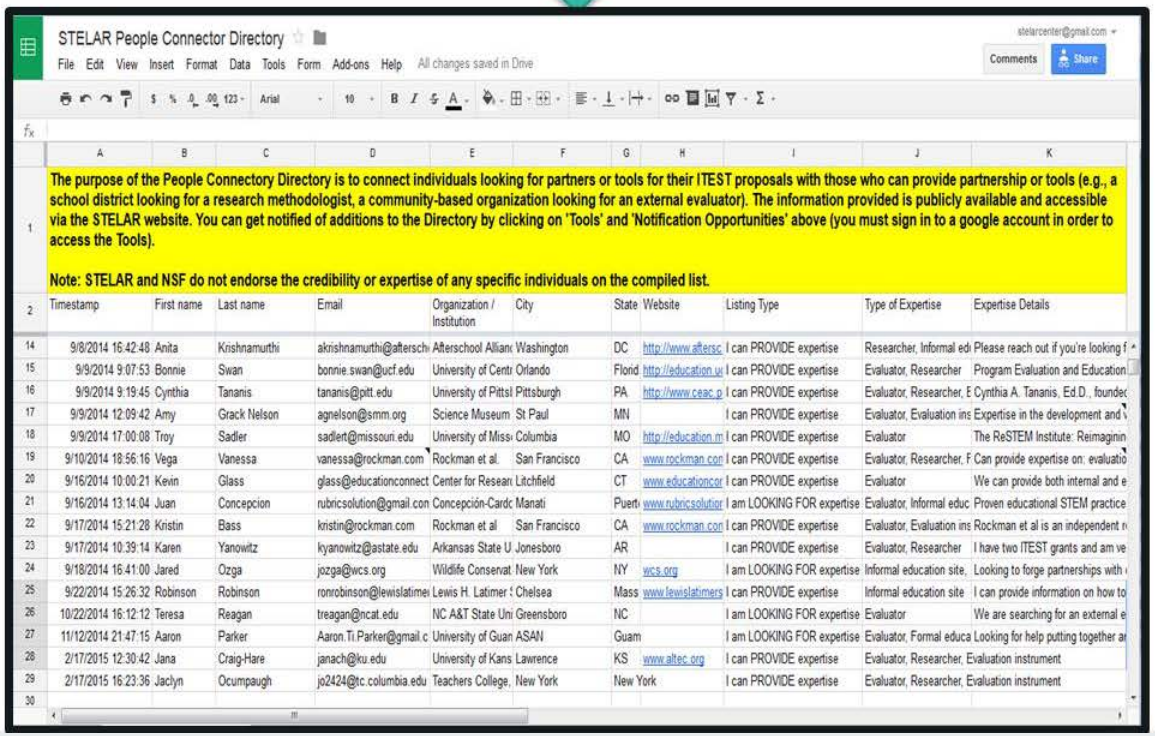


Connect with others via the People Connector

http://stelar.edc.org/opportunities/people-connector-directory

People Connector Form

People Connector Directory



And lots more!

Resources

1 - 8 of 473

Events | News | Instruments | Publications | Opportunities | Curricular Materials

SEARCH FOR RESOURCES

Multiple criteria within a field condition. Multiple fields are

TEXT SEARCH

RESOURCE TYPE

DISCIPLINE(S)

TOPIC(S)

Apply Filters

$1.1 million grant will fund 3 years of scientific research

News

ITEST project WNY Genetics in Research Partnership has secured funding to enable teachers and high school students from 13 counties in Western and Central New York to conduct scientific research in bioinformatics during the next three years....

STELAR Materials

Share / Save

The ITEST LRC (2003-2012) and the STELAR Center have produced reports, webinars, and other events as resources to all those working to broaden participation in the STEM workforce to traditionally underrepresented populations. Browse the resources, and let us know what else you would like to see by emailing stelar@edc.org.

- MANAGEMENT INFORMATION SYSTEM (MIS) REPORTS
- NEWSLETTER ARCHIVE
- THEMATIC HIGHLIGHTS ARCHIVE
- WEBINAR ARCHIVE
- CONVENINGS

Dissemination Strategies

Apr | 2015

Dissemination Strategies

Highly effective dissemination strategies are crucial to a a project's impact but projects often struggle with how best to synthesize and share findings and to identify which venues to pursue to best reach their target audiences. The resources compiled here share considerations and program strategies related to dissemination, tools and technologies that can be employed, examples of new dissemination venues or modalities such as social media, online journals, and other lessons learned, successes and challenges to effectively disseminating project findings.

RESOURCES

STELAR Webinar: Effective Dissemination Plans – Success Strategies for Projects and Proposals

(EVENT) Attendees learned how to develop highly effective dissemination plans from seasoned PIs in ITEST and other NSF programs. Presenters shared strategies, lessons learned, ways to leverage technology, and helped to identify non-traditional dissemination venues that are often overlooked.

READ MORE »

ITEST Conference Symposia for 2015

(NEWS) STELAR collaborated with ITEST projects on a number of conference symposium proposals during 2014 for the 2015 conference year.

READ MORE »

Project Spotlight: Fueling the Ocean STEM Workforce Pipeline

Recent Highlights

Mar | 2015
Cyberlearning

Feb | 2015
Research in ITEST

Jan | 2015
Mentoring in ITEST

Dec | 2014
Computer Science Education

Oct | 2014
Working with Diverse

Upcoming Opportunities

Call for Papers: IEEE TLT Special Issue on Wearable Tech and the Internet of Things in Education/Training
Due by Monday, June 15, 2015 | READ MORE »

Journal of Science Education and Technology - ITEST Special Issue Call for Papers
Due by Monday, June 15, 2015 | READ MORE »

U.S. News STEM Solutions National Leadership Conference
Due by Monday, June 29, 2015 | READ MORE »

The Saint Paul Foundation - Advancing Racial Equity Grant Opportunity
Due by Tuesday, June 30, 2015 | READ MORE »

People Connector Directory for ITEST Proposals
READ MORE »

STELAR

Monthly Highlight

Dissemination Strategies

read more »

STELAR Newsletter

News from ITEST, current events, and more.

Current Newsletter »

Newsletter Archives »

Blog

May 27, 2015
Project Spotlight: Barcoding Life's Matrix
STELAR had the opportunity to speak with Ralph Imondi (Coastal Marine Biolabs Integrative

READ FULL POST »

May 7, 2015
Fostering and Maintaining Students' Interest in Engineering

STELAR is on Social Media – Stay in Touch!

Contact us: stelar@edc.org

“Like” us: https://www.facebook.com/stelarctr

Follow us: https://twitter.com/STELAR_CTR

Watch us: https://www.youtube.com/user/stelarcenter

Find resources: http://stelar.edc.org/

NSF Next Generation STEM Learning for All

- Showcased NSF-funded research and development and informed policy makers about the potential to transform STEM learning and education
- Engaged a broad community of stakeholders in envisioning the future of STEM learning and in strategizing how to best achieve collective impact
- Facilitated networking across stakeholder groups to leverage skills and strengthen connections, collaboration, and coordination toward national goals for STEM education

http://nsfstemforum.edc.org

Today's presenters

Anthony Kelly: Senior Advisor in the Education and Human Resources Directorate at the National Science Foundation

Lauren Birney: Assistant Professor, Pace University School of Education and Co-Director of the STEM Collaboratory NYC™

Leslie Herrenkohl: Co-Director of the 3DL Partnership and Professor in the College of Education at the University of Washington

John Cherniavski: Senior Advisor in Division of Research on Learning in Formal and Informal Environments at the National Science Foundation

Evaluation link

Please click here to provide feedback on this webinar:
https://edc.co1.qualtrics.com/SE/?SID=SV_5irt07skpMZDcCF

Smart and Connected Communities: STEM, STEM Education, STEM Education Research

Anthony E. Kelly
Senior Advisor
Directorate for Education and Human Resources
National Science Foundation
akelly@nsf.gov

Who is eligible for funding under the S&CC Dear Colleague Letter?

1. Principal Investigators (PIs) with an existing award that can be supplemented
2. PIs who work with a program officer to submit an EAGER proposal with a March 1, 2016 deadline

EAGER guidelines: http://www.nsf.gov/pubs/policydocs/pappguide/nsf15001/gpg_2.jsp#IID2

Read the S&CC Dear Colleague Letter!

http://www.nsf.gov/pubs/2015/nsf15120/nsf15120.jsp

Talk to a program officer! Program officers are listed on the Dear Colleague Letter.

Note: Taylor Martin is no longer with the NSF.

Please substitute: John Cherniavsky, jchernia@nsf.gov

What is a “smart and connected community” problem?

- A S&CC problem is one that motivates some community (e.g., tribe, region, town, rural group, city, megacity) to work with researchers and other professionals to design, deploy and evaluate an intervention that has potential to ameliorate the identified problem.
- An intervention is “smart and connected” when it takes advantage of emerging nested systems of cyber physical sensors, Internet of Things, wearable technologies, mobile systems, etc.
- An intervention is “smart and connected” when it involves the creative engagement of one or more communities and their distributed human and social capital (e.g., tribal representatives, city planners, formal and informal education participants, including teachers, students, citizen scientists, or the maker movement).
- A compelling case should be made that the intervention is likely to lead to outcomes such as powerful and resilient models and solutions, efficiencies in resources, advances in science and engineering knowledge and practices, and STEM education practices and research.

Proposals are encouraged on smart and connected research methodology…

- All communities are distinctive: Interventions may need to respond to unique physical, social, cultural, political, resource, and economic contexts.
- Activity is malleable and collaborative: Interventions are likely to be field based, iterative, and involve human centric design-based research methods [see Bannan (2015)] https://www.nitrd.gov/nitrdgroups/index.php?title=SmartCities_CaseExample_Bannan].
- The law of unintended consequences: Interventions are likely to be deployed in a complex system with unexpected interdependencies that may need to be documented or accounted for (e.g., a water runoff intervention may add to pollution; improved traffic flow for airport staff in one city may positively impact congestion in the airport traffic of a distant city)
- Communities do not exist in a vacuum: In some cases, exogenous challenges may require attention (e.g., changes in political support, privacy concerns, cyber attacks, natural disasters).

Research is required on smart and connected, project capacity building and communication…

Metrics:

- The design of qualitative and quantitative indicators that operationalize the subjective nature of the outcomes: "personal quality of life, community and environmental health, social well-being, educational achievement, or overall economic growth and stability" -- from the Dear Colleague Letter.
- Methods of hypothesis generation and testing using a range of research and evaluation approaches to assess outcomes from S&CC projects.

Data management, sharing, and analysis:

- How to document, disseminate, and scale successful interventions, and to communicate lessons learned.
- Methods to link personnel across a variety of S&CC projects and to share data and methods so as to synergize resources and enrich the lessons learned about science and engineering content and practices, and about STEM education.

Growth:

- How to build community and capacity in the scientific and educational workforce in order to design, deploy and communicate effective S&CC models and interventions.

Summary

Consistent with the goals of broadening participation, advancing scientific knowledge and educational practices, and promoting scientific workforce development, we welcome great ideas on how:

- the wide range of resources of formal and informal education
- research on teaching and learning
- knowledge of curricular design and development
- research on graduate and postdoctoral education
- effective cyberlearning strategies
- workforce development strategies
- research and evaluation innovations
- indicator and assessment innovations
- and related resources . . .

may maximize the many opportunities provided by smart and connected technological and social ecosystems to enable more livable, workable, sustainable, and connected communities.

NSF-EHR S&CC Dear Colleague Letter Contact

John Cherniavsky

Program Officer

jchernia@nsf.gov

(703) 292-5136

Lauren Birney| Assistant Professor
Pace University | School of Education
Principal Investigator DRL 1440869
NSF Smart and Connected Communities ITEST Webinar
January 21, 2016

CCERS

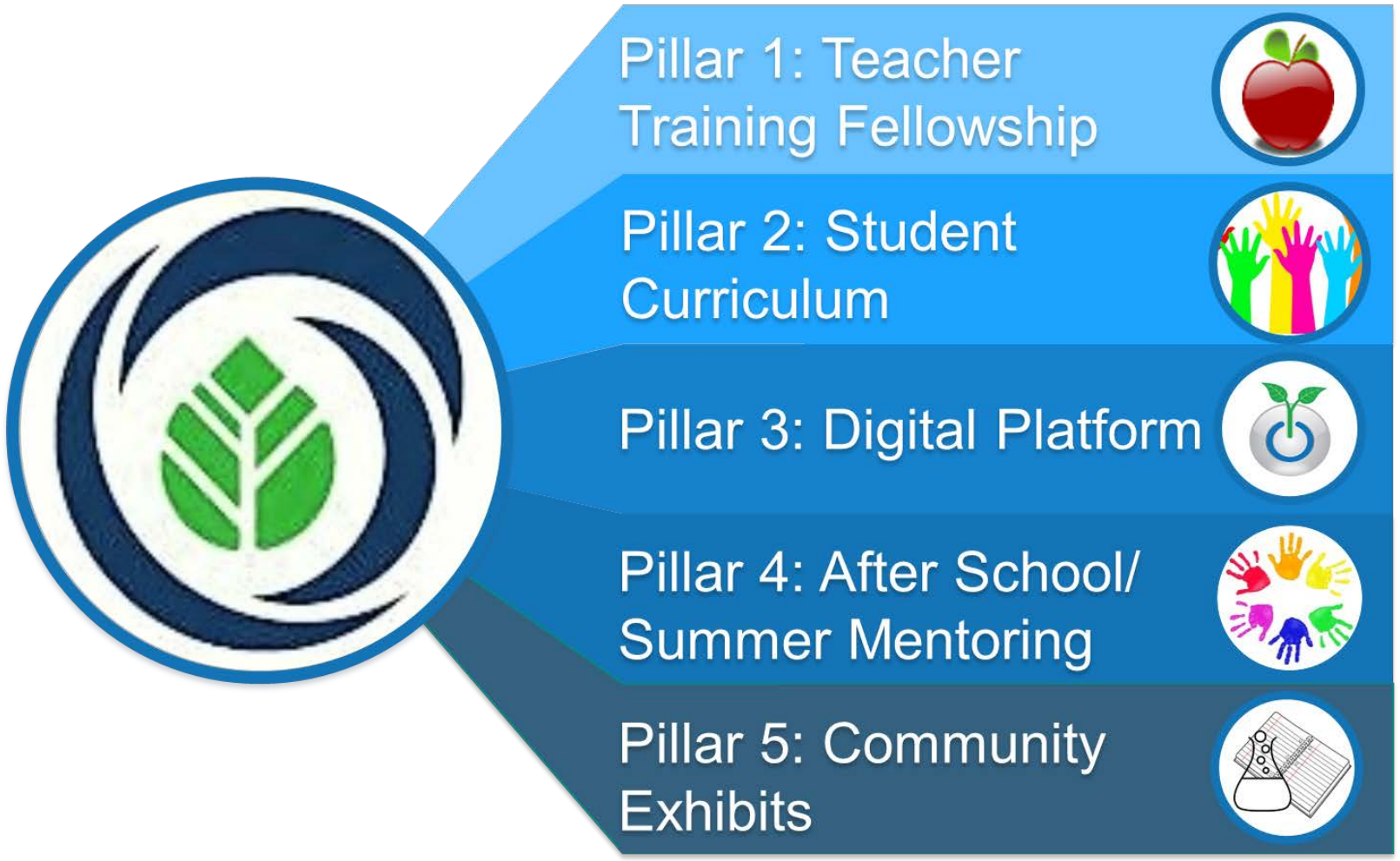
Curriculum + Community Enterprise for Restoration Science in New York Harbor

Lamont-Doherty Earth Observatory
Columbia University | Earth Institute
School of Education
Pace University
Billion Oyster Project
New York Harbor Foundation
Good Shepherd Services
We see what can be.
The River Project
NYC Department of Education
Wildlife Conservation Society
New York Aquarium
NSF
The New York Academy of Sciences
Building communities, advancing science since 1817
SMART START
Evaluation & Research
University of Maryland
Center for Environmental Science

Project Partners

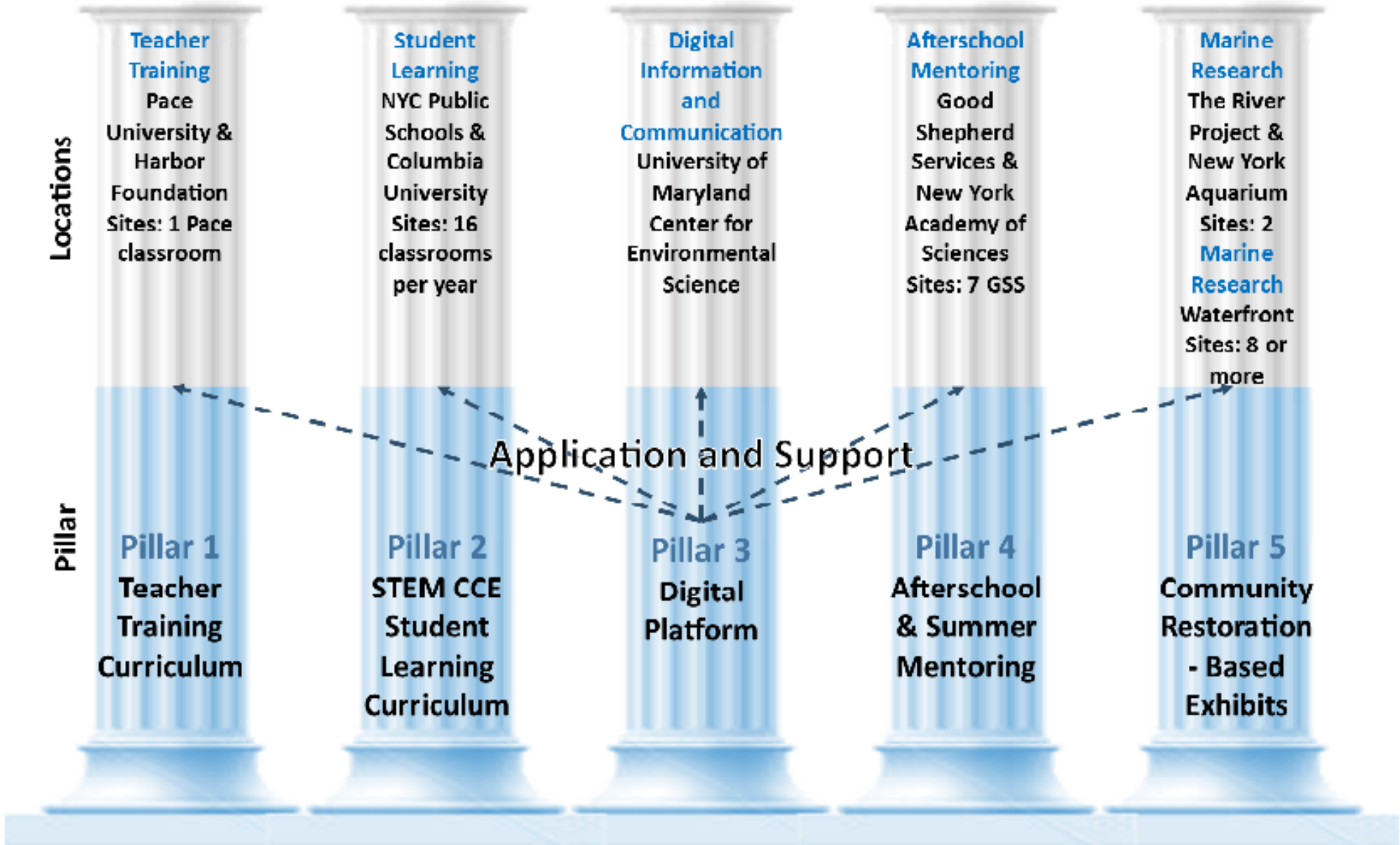
Pace University Teacher Training; Pedagogical Inputs
New York Harbor Foundation Oyster restoration & pedagogical model
Columbia University Field science research protocol & curriculum development
New York Academy of Sciences After-school STEM Mentoring & Curriculum Development
The Good Shepherd Service After-school STEM Mentoring and programming
University of Maryland Center for Environ Science Tech development and field ecology
The River Project Informal Education and field training
The New York Aquarium Informal education, Field Trips, Museum Exhibition
NYC Department of Education Access to teachers, students and schools
Gaylen Moore Incorporated External Evaluation
SmartStart Corporation Evaluation and research.
NSF EHR and ITEST Funding ($5M/3 years). DRL 1440869

CCERS



The CCERS model is a multifaceted approach used to integrate restoration science into the middle school STEM curriculum.

STEM Curriculum + Community Enterprise for Restoration Science (STEM CCE-RS) Project



Short-term process

- Create Teacher Training Fellowship for professional development.
- Create digital repository of CCERS project materials and lesson plans.
- Create mobile application for citizen scientists to monitor environment.
- Engage public in inquiry on oysters, & biodiversity in local environment.
- Increase STEM-C knowledge by demonstrating real world applications.

Teacher Training

Train teachers to more effectively teach STEM-C concepts using restoration science by implementing PBL into their classrooms

Student Curriculum

Provide engaging STEM-C lessons focusing on harbor restoration and research activities for students within their daily classroom lessons

Digital Platform

Create a digital platform where teachers can contribute and collaborate on lessons and data centered on restoration science

Afterschool Summer Mentoring

Develop curriculum tailored to low-resource settings to engage students in STEM-C concepts by focusing on invertebrate zoology

Community Exhibits

Develop interactive exhibits for students and others to learn about oysters' role in the local ecosystem and biodiversity in the harbor

- **Develop curriculum** using restoration science to teach core STEM-C concepts to middle school students across various educational settings.
- Create **replicable model** transportable into other locations and environments to increase student learning and restoration efforts.

Long-term vision of model

Restoration Goal: Bring Oysters back to New York Harbor

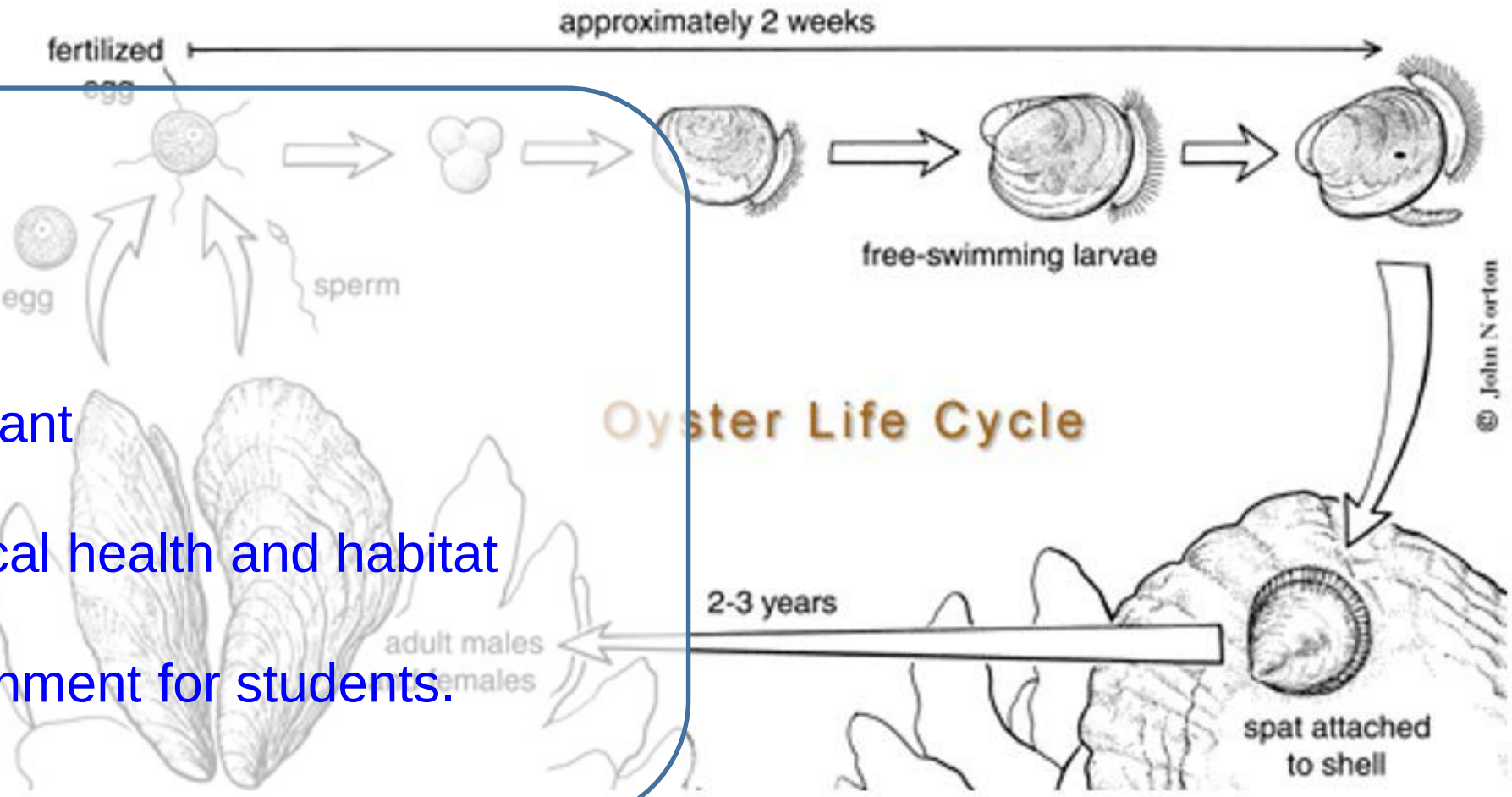
Why oysters?

Keystone species

Historically abundant

Critical to ecological health and habitat

Accessible environment for students.



Goal of Project: expand to other keystone species in other environments.

Monthly Teaching Fellowship Workshops

- Teacher training at Pace University's School of Education.
- 20 to 25 teachers in each cohort/ 44 Teachers 24 Schools
- Responsible for implementing the curriculum. → Drill down to units and lesson plans.
- Several weekend days devoted to learning and practicing field protocols.

3 Hours: 5:30 – 8:30

Dinner

Invited science speaker

Hands-on activity

Housekeeping

Evaluation materials

Topics	Invited Guests
Intro to New York Harbor	John Waldman
Environmental Microbiology	Greg O'Mullan
Water Chemistry	Brett Branco
Oyster Reef Ecology	David Kimbro
Oyster Biology and Aquaculture	Peter and Steve Malinowski
Field Science (prep)	
Field Science (technical)	David Strayer, Dave Bushek
Nutrient Cycling	Chester Zarnoch
Big Picture: Social Ecological Change	Kate Orff

Each teaching Fellow is responsible to take their class on at least one Field trip to our partnering aquariums.

The River Project

- Pier 40 on the Hudson River
- Touch tanks with HR critters
- Flow-through estuary water
- Experienced staff
- Informal, adaptable work space

New York Aquarium Exhibit – Planned for Spring 2017

(Currently rebuilding from storm (Sandy) damage

Introduction to NY Harbor Ecology/Geography/History (whole class)

Stations: (Students in 4 groups and rotate through each of these stations)

- Lab Tour
  - Hudson River biodiversity! Touch tank, crabs ….
  - Habitat and habits, predator and prey relationships
  - Closer look at Hudson River ecosystem and ecology
- Water Quality Monitoring
  - Turbidity
  - Salinity
  - Temperature
  - Data collection and comparison – research methods
  - How it relates to oysters
- Oyster Reef
  - NYC oyster history
  - Other animals in reef
  - Handling live oysters
  - Ecosystem services, other sessile organisms, predators
- Oyster anatomy
  - Pre-shucked oysters
    - 3 per student,
    - Go through anatomy with students as a group
    - Students explore the oysters in pairs
- Wrap-up
  - Conclusion discussion about trip
  - Washing hands / post-trip evaluation survey

After-School STEM Mentoring New York Academy of Sciences and the Good Shepherd Services

STEM programming – meeting enhanced NYC standards for after school programs.

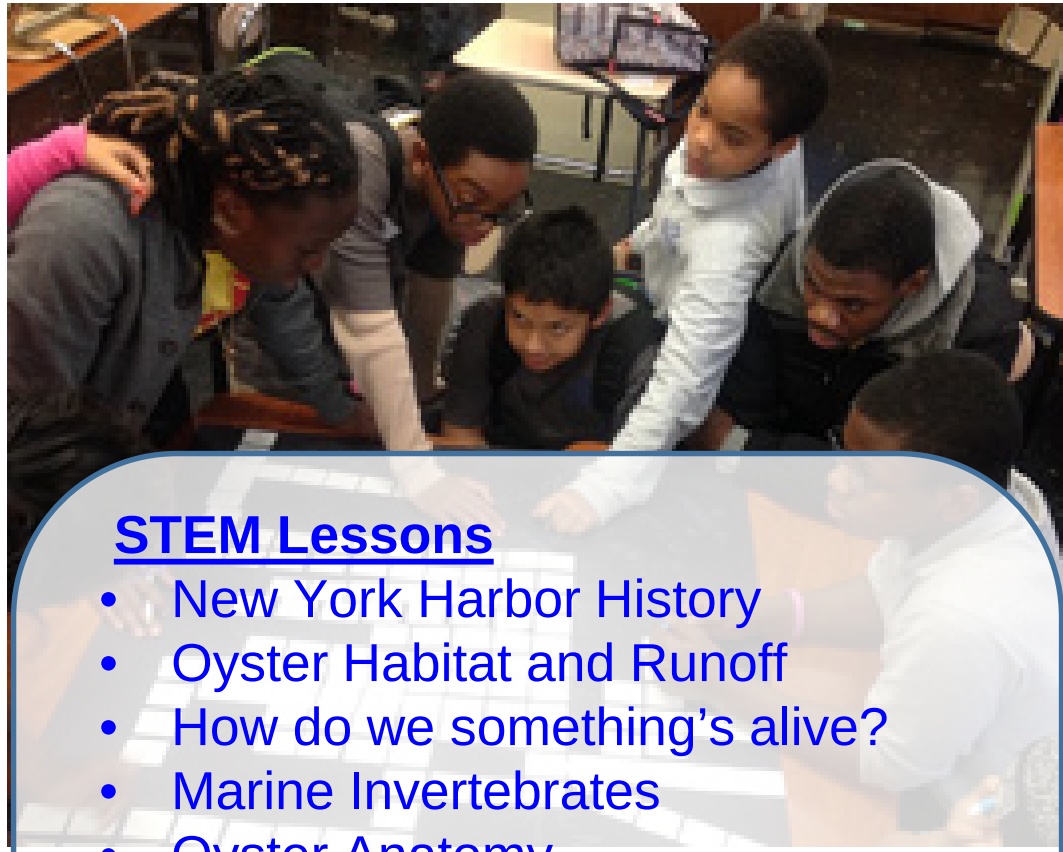
Wrap-around programming: in and out of school. Serving working class and poor families.

8 Schools

Year 1: developed 10 units, with full sets of supporting materials.

Graduate student after-school teaching assistants.

Building on existing NYAS programming, aiming for permanent expansion of NYAS/GSS programming.



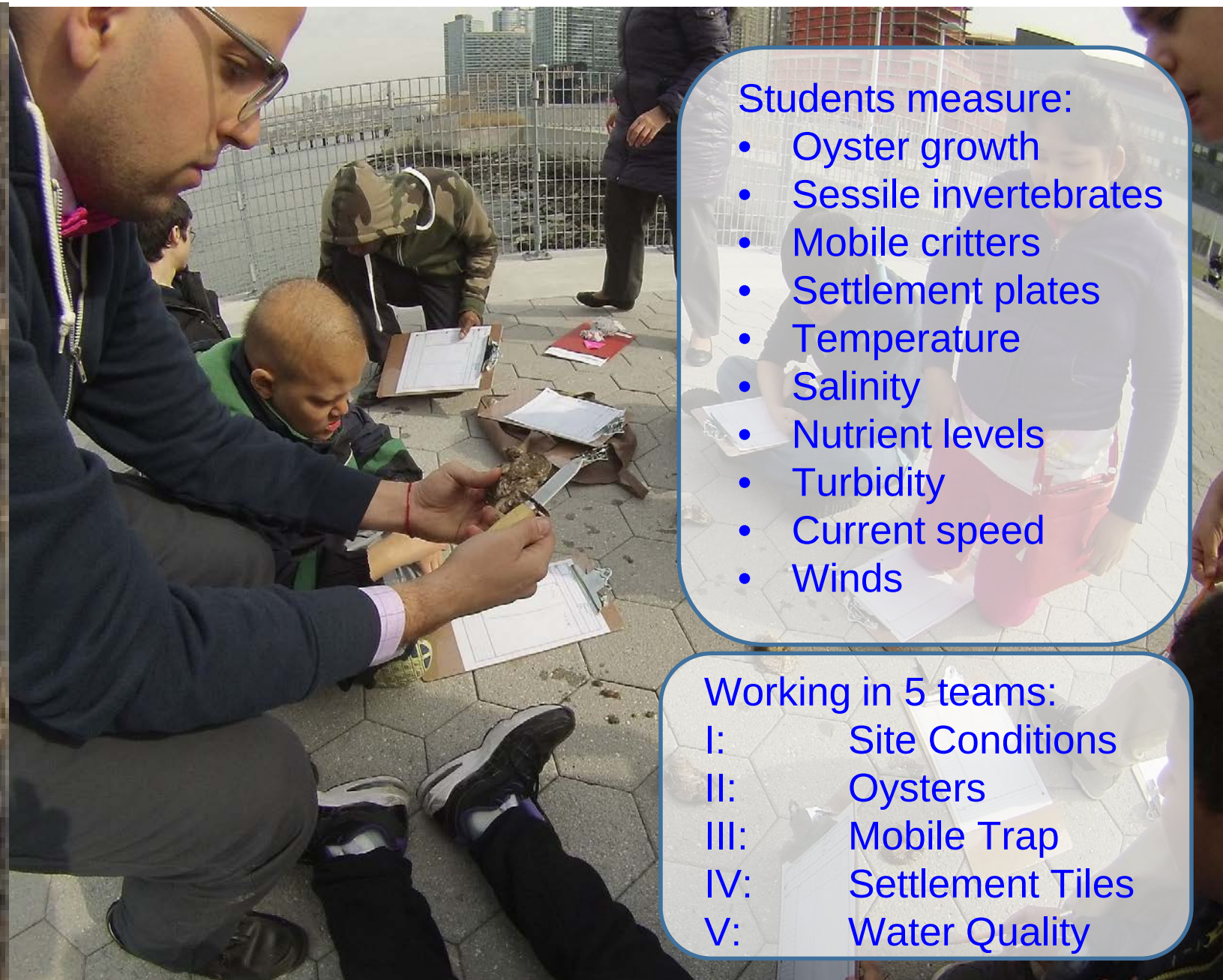
STEM Lessons

- New York Harbor History
- Oyster Habitat and Runoff
- How do we something's alive?
- Marine Invertebrates
- Oyster Anatomy
- Oyster Filtration
- Oyster Life Cycle
- Oyster Habitat and Diversity
- What is an Estuarine Ecosystem?
- Oyster Habitat and Water Quality
- Capstone: Oyster Gardening
- Capstone: PSA Project

New York Harbor Fieldwork: 33 Restoration Sites

On shorelines in all 5 New York City boroughs:

- East River
- Harlem River
- Hudson River
- Bronx River
- Arthur Kill
- Kill Van Kull
- Mill Basin
- Coney Island Creek
- Flushing Bay
- Great Kills Harbor
- Coney Island Creek
- Jamaica Bay
- Navy Yard Basin
- Paerdegat Basin
- Upper NY Bay



Students measure:

- Oyster growth
- Sessile invertebrates
- Mobile critters
- Settlement plates
- Temperature
- Salinity
- Nutrient levels
- Turbidity
- Current speed
- Winds

Working in 5 teams:

I: Site Conditions
II: Oysters
III: Mobile Trap
IV: Settlement Tiles
V: Water Quality

Technical Infrastructure

Smartphone app for data input

- Species key with photos
- Input assists with basic quality checks

Central repository for

- Lesson plans
- Protocols and field guides
- Shared data
- Classroom dashboard for access and exchange

Broader Impact NSF CCERS

CCERS	Organization	Community Outreach/Broader Impacts	Resources
Pillar 1 **Teacher Training**	Pace University NYHF New York Department of Education Columbia University	The STEM Collaboratory NYC™ Citizen Scientists Summer STEM Colloquia and Forum for Middle Schools Students and Teachers	http://seidenbergnews.blogs.pace.edu/2014/08/08/stem-camp-2014/ http://billionoysterproject.org/training/ http://www.billionoysterproject.org/bopeople-meet-a-citizen-scientist/
Pillar 2 **Field Science Research**	Columbia University NYHF	Research Programs and Institutions for Teachers	http://www.ldeo.columbia.edu/SSFRP
Pillar 3 **Digital Platform**	University of Maryland Center for Environmental Sciences	World Harbor Foundation; International Growth and Partners Blogging, Environmental Research, Publications	http://ian.umces.edu/blog/2015/07/02/first-annual-bop-stem-symposium-part-1/
Pillar 4 **Afterschool STEM Mentoring**	The New York Academy of Sciences Good Shepherd Services	Advanced STEM Summer Programs for Students Camp Restore	http://www.nyas.org/landing/afterschool.aspx http://goodshepherds.org/hello-world/
Pillar 5 **Museum Exhibitions and Field Trips**	The New York Aquarium The River Project	Summer Internships and Externships for Teachers and Students	http://nyaquarium.com/activities http://www.riverprojectnyc.org/education_fieldtrips.php http://www.riverprojectnyc.org/education_mbip.php

STEM CCERS Smart and Connected Communities Draft 1/2016

I. **Challenge:** How do you involve middle school students to become engaged with STEM Education as Citizen Scientists and create opportunities for sustainable community involvement?

II. **Solution: Replicable Model** " The Living Ecosystem - New York City Harbor"
Environmental Restoration through Citizen Science and Inquiry Based Learning with Three Distinct Learning Strands

III. **Evidence of Research**: Dissemination of Findings
Webinars, Podcasts, Presentations, Publications
Public Interest Papers, White paper

Smart and Connected Community Project Parameters *Draft 1/2016*

I. SCC Project Objective

This project focuses upon the expansion of the existing ***"Curriculum and Community Enterprise for the Restoration of New York Harbor in New York City Public Schools" DRL 1440869***. In particular, we aim to incorporate components of the project that leverage the assets set forth by Smart and Connected Communities and their ability to incorporate environmental restoration through citizen science, community support, local collaborations and global partnerships. It is the unique connection and inter-dependency of these particular facets that will allow New York Harbor as the central hub of e-commerce to expand, grow, cultivate and ultimately flourish and thrive.

II. SCC Program Goals

1. Establish a Comprehensive Model that depicts an interdependent, innovative system composed of stakeholders, constituents and collaborators.
2. Identify Industry Partners for collaborations and partnerships whom will offer; guest speakers, internships, externships, mentorships and project collaborations.
3. Identify Corporate Partners for continued funding, partnership collaborations and support.

III. Educational Vertical Planning Pods

Strand Leaders, Corporate Partner, Faculty Member, Graduate Student, Undergraduate Student, HS/MS Teacher, High School Student, Middle School Student

I. Summer Colloquia and Think Tank – Pace University (3 week sessions)

II. Internships and Externships with Corporate Sponsors

III. White Paper and Project Dissemination National and International

Educational Vertical Planning Pods *Draft 1/2016*

Environmental Science

Environmenal Restoration and Citizen Science

Murray Fisher

New York Harbor Foundation
New York Aquarium
Camp Restore GSS
CLDEO Summer PRogram
NYAS STEM Mentoring Program
The River Project - Field Trips

Environmental Policy and Law

Environmental Policy and Law

Jason Czarnezski and John Cronin

Pace Law School
Pace Environmental Center
World Conservation Society
Senator Gillarbrand's Office

Technological Innovations

Environmental Technological Innovations

Lauen Birney, Jonathan Hill and Brian Evans

Pace Seidenberg
Fearless Solutions
Google
Microsoft
University of Maryland Center for Environmental Sciences

Grazie! Lauren Birney lbirney@pace.edu Pace University, New York City

NSF DRL 1440869/PI Birney

UNIVERSITY of WASHINGTON

STUDIO: Build Our World

A University-Community Collaboration to Support Low-Income and Immigrant Youth in STEM

Leslie Rupert Herrenkohl, Ph.D.

University of Washington & Neighborhood House

(NSF DRL # 1310817/1311253)

STELAR WEBINAR on Smart & Connected Communities

January 21, 2016

3dL Partnership
Integrating social, emotional, and intellectual learning

Neighborhood House

DREAM PROJECT

What is STUDIO?

A program that supports middle and high school youth to:

Develop interest, motivation, & identification with STEM

Learn about STEM higher education & STEM careers

Principles

1. STEM is a human activity grounded in culture and place
2. Equity in STEM requires providing access to opportunities and recognizing the contributions youth and their communities make to STEM
3. Locating STEM programming inside a wrap-around service organization provides for multiple needs of youth and their families
4. Out-of-school STEM learning opportunities in middle and high school are critical to support long-term STEM engagement

University of Washington (UW)

The University of Washington has exemplary programs in Engineering, Computer Science, Arts & Sciences, and Medicine. STUDIO partners with the UW Undergraduate Academic Affairs' Dream Project (which focuses on mentoring for college readiness and postsecondary success), the Pipeline Project (which focuses on tutoring), and UW Departmental Advisors to recruit mentors from STEM disciplines. For 2015-2016, STUDIO is also working with student organizations to recruit more African American and African immigrant mentors. All mentors participate in the UW and NH orientation and must attend a weekly service learning seminar on campus. We ask mentors to commit for the academic year.

High Point Neighborhood House (NH)

NH has been working in the low-income community of High Point since 1966 and opened its High Point Center in 2009. The High Point neighborhood is home to:

- 2,127 individuals (580 families)
- 54% of its residents under 18
- 42% of the children/youth served are immigrants and refugees from East Africa (Somali, Ethiopian and Eritrean)
- 13% are immigrants and refugees from Southeast Asia (Vietnamese and Cambodian)
- 3% are immigrants and refugees from Central and South America

2014-2015 Neighborhood House Youth

2015-2016 UW Mentors

UW STEM MAJORS:

Computer Engineering
Applied Physics
Chemistry
Mathematics
Molecular, Cellular, & Developmental Biology
Human Centered Design & Engineering,
Aerospace Engineering
Microbiology

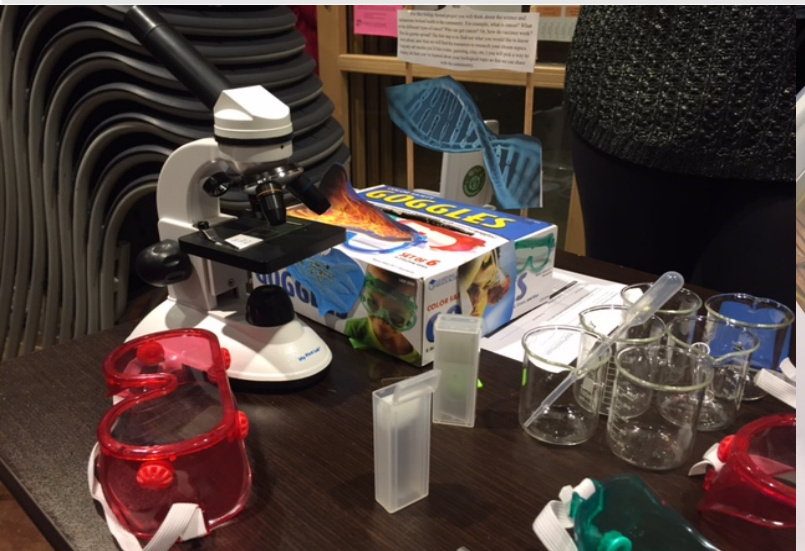
STUDIO Activities

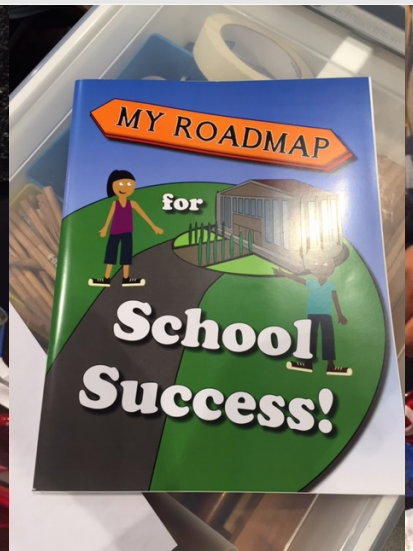
Year 1 (2014-2015)

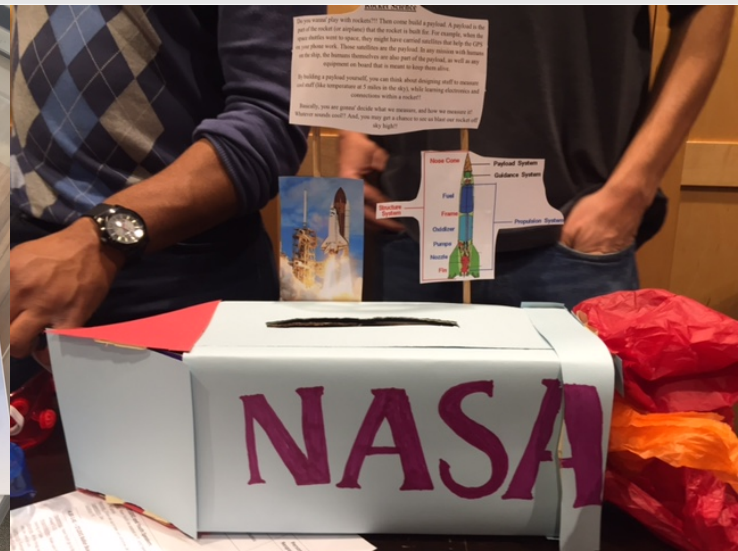
- Making & Tinkering Hands-on Activities
- Digital Tinkering, Coding, and Gaming
- Making & Tinkering in Health

Year 2 (2015-2016)

Using curriculum developed/adapted in 2014-2015 with a focus on increasing NH youth agency through interest-driven, sustained project work that utilizes NH staff and UW mentor expertise. Integrate discussions of college and career throughout activities.







Place, context, & systems as a key to smart & connected communities

Making & Tinkering in Health

STUDIO: Some conclusions & considerations

-Makes access to programing for low income and immigrant youth “at their back door”

-Provides broad support services for families and youth

-Increases opportunities to meet families and receive input from and recognize STEM assets in the community

-Shared priorities yet complementary expertise mean our organizations could not do this work alone

-Time intensive work that requires significant relationship building & trust

-Work culture expectations and differences can create challenges

-Communication and coordination require careful consideration to establish effective practices

-Onboarding newcomers (youth, mentors) while continuing to support existing participants can be a challenge

-Staff turnover can create stress and uncertainty

THANK YOU

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EHR and S&CC

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Some Useful Links for S&CC

- NSF December meeting: http://www.bu.edu/systems/nsf-conference-december-3-4-2015/nsf-agenda/
- CIRCL Ideas Lab: http://circlcenter.org/events/innovation-lab/
- EnvisionAmerica: http://envisionamerica.org/proposed-agenda/
- NSF Seattle Meeting: http://cps-vo.org/group/NSF-SmartCities2016/program-agenda
- NSF DCL on Smart and Connected Communities: http://www.nsf.gov/pubs/2015/nsf15120/nsf15120.jsp
- White House S&CC: https://www.whitehouse.gov/the-press-office/2015/09/14/fact-sheet-administration-announces-new-smart-cities-initiative-help
- NIST Global Cities: http://www.nist.gov/public_affairs/releases/nist-global-city-teams-challenge-aims-to-create-smart-cities.cfm
- NIST and NSF EAGER on Global City Teams Challenge: http://www.nsf.gov/pubs/2016/nsf16036/nsf16036.jsp
- European Open Living Labs: http://openlivinglabs.eu/node/923
- Living Lab Handbook: http://www.ltu.se/centres/cdt/Resultat/2.59039/Metoder-och-handbocker/Living-Labs-1.101555?l=en

Some EHR Connections to Smart and Connected Communities

- Workforce Development – S&CC Multidisciplinary Communities of Interest to develop a workforce capable of working on S&CC problems
- Complex System Development and Representations for S&CC – EHR researchers would be part of such a complex system where the collective intelligence of the Community is studied as S&CC problems are addressed
- Instilling civic and societal responsibility in young people – learning as they actively engage in addressing S&CC problems
- Use of learning technologies in addressing S&CC problems – examples include augmented reality, data mining, multi-media visualizations, and other mechanisms to enhance learning of complex systems

Example 1: Digital Youth Network and Chicago City of Learning

The Digital Youth Network is, at its core, a design-based research project. The research team works with DYN mentors, students, families, and other practitioners to better understand the impact of DYN initiatives and learning environments on youth, educators, organizations, and communities, identifying critical practices and informing iterations of the DYN model. Current research questions include:
How do we understand and represent learning and participation in informal (including online) environments and over time?

Broadening Participation in Computing through a Community Approach to Learning

Developing frameworks, tools, and social practices to support effective instructor use of online social learning networks in blended learning models

Exploring learning, participation, and mentorship in the Chicago Summer of Learning (CSOL) 2013

Identifying educator roles that support students in online environments

Cultivating Digital Citizenship and Creative Production at Renaissance Academy

https://chicagocityoflearning.org/ and http://www.digitalyouthnetwork.org/

Example 2: Schools as part of S&CC team

Hypothetical Example

High School students in communities in the Marcellus Pennsylvania are part of a team of scientists, community leaders, and Marcellus Shale Coalition studying the effects of fracking in the Appalachian Basin. The students act both as citizen scientists collecting water samples and air samples from near their homes and as students in science courses (environmental or earth sciences) in their schools. Through the use of data mining, visualization tools and simulation and modeling tools they have full access to all the data collected to analyze the economic impact of fracking on Appalachian communities (this includes job data, data on transportation and other infrastructure, health data, environmental impact data, etc.). Learning scientists associated with the S&CC project using design based implementation research methods study the effectiveness of student learning through their involvement in the S&CC project.

Example 3: Workforce Development Possibilities

National Science Foundation Research Traineeships

https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505015

New Programs at Universities

Example NYU Center for Urban Science + Progress (CUSP)

Urban informatics uses data to better understand how cities work. This understanding can remedy a wide range of issues affecting the everyday lives of citizens and the long-term health and efficiency of cities — from morning commutes to emergency preparedness to air quality. CUSP aims to be the world's leading authority on the emerging field of urban informatics, with New York City as its laboratory and classroom. The urban issues CUSP takes on will be New York's. The solutions it creates will make the city more productive, livable, equitable, and resilient.