"Integrating Environmental Restoration with Computer Science in New York Harbor with New York City Public Schools”

BOP CCERS Phase III
Manhattan, New York – New York Harbor 2019
STEM + C in New York City and New York Harbor
An Educational Model Incorporating Computational Thinking and Computer Science through Environmental Restoration with Student Field Research and Inquiry Learning
The Story of New York City Public School Students
STEM + Computation Thinking through Environmental Restoration Sciences
BOP CCERS Project Implementation Research and Design Framework
Environmental Science Teacher Trainings with Computer Science, Data Science and STEM Career Exploration  
Student Curriculum with Computer Science, Data Science and STEM Career Exploration, Pillar 3: Summer STEM Institute for Middle and High School Students at Pace University  
Pillar 4: Community Based Restoration Science Hubs - "STEM Hubs"
Pillar 1: Teacher Trainings with Computer Science, Data Science and STEM Career Exploration (NYCDOE, BOP, Pace University)
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Pillar 2: Student Curriculum with Computer Science, Data Science and STEM Career Exploration
Pillar 3: Summer STEM Institute for Middle and High School Students at Pace University
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Pillar 4: Restoration Science Training Hubs in New York Harbor

Ben Von Wong
Pillar 4: Restoration Science Training Hubs in New York Harbor
STEM+C OYSTER RESEARCH STATION (ORS) BASIC TRAINING

BOP STEM+C conducted Oyster Research Station (ORS) professional learning sessions on Governors Island for teachers, museum educators, citizen scientists and community volunteers to learn how to set up an oyster research station anywhere in the New York Harbor.

<table>
<thead>
<tr>
<th>Teachers: As a result of participating in this BOP professional development or training activity:</th>
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</thead>
<tbody>
<tr>
<td>I increased my knowledge of STEM concepts and content related to restoration science and BOP. (n=11)</td>
</tr>
<tr>
<td>I increased my knowledge of computer science concepts and content. (n=3)</td>
</tr>
<tr>
<td>I increased my knowledge of data science concepts and content. (n=8)</td>
</tr>
<tr>
<td>I increased my knowledge of STEM careers that I can share with my students. (n=9)</td>
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<tr>
<td>I learned practices that I can use to facilitate student learning of harbor restoration research. (n=11)</td>
</tr>
<tr>
<td>The hands-on activities in this session give me a model for teaching this content to my students. (n=11)</td>
</tr>
<tr>
<td>I feel more prepared to teach the content and support students’ learning of this content. (n=11)</td>
</tr>
<tr>
<td>I received the resources necessary to carry out this lesson or activity with my students. (n=11)</td>
</tr>
</tbody>
</table>
Potential STEM Learning Center and Oyster Park
Community Impact Factors New York City

78 Public Middle Schools
118 Waterfront field locations
5600 Students
127 Teachers
110 Citizen scientist volunteers

Digital platform
Inquiry-based curriculum
Regular in person events
Student led research
Citizen science
168 environmental datasets collected by
Establishing a Project Footprint BOP CCERS Project Deliverables and Project Outcomes

Broadening Participation and Intellectual Merit

- Curriculum for Middle School Teachers
- Field Science Manual for New York Harbor
- Project White Paper
- Scholarly Publications and Articles
- Presentations, Symposia and Colloquia
- Videos and Film Productions
- Digital Monitoring Platform (Big Data)
- Permanent Displays and Exhibits at Institutions
- STEM Teacher Training Model Education
- STEM Mentoring Model
- Restoration Based Community Science Model
- Mobile Applications/Computer Science
Current Impact I: Global and Community Partnerships; Citizen and Community Science through Computational Thinking and Environmental Restoration New York Harbor, New York
Current Impact II: Engaging The Community of New York City In Environmental Restoration Research
Community Exhibit and Training Facility at The New York Aquarium
Current Impact III: STEM Career Technical Training and Preparation for New York City Public School Students
Living Breakwaters – Staten Island, New York
Future Impact I: New York Harbor Landscape New York Harbor 2022 (Design by Scape)
Future Impact II: The Living Breakwaters, Staten Island, New York  2024 (Designed by Scape)
The Collaborative Model

Intricate Details and Workings of our Living Ecosystem;

Creating a Balance

• Communication between Partners (Monthly Meetings)
• Communication within each Pillar (Monthly Meetings)
• Permanent Project Impacts
• Sustainability of the Project
• Project Website and Logo
• Committed Project Personnel/Trainings/Team Building
STEM + C “Integrating Environmental Restoration with Computer Science in New York Harbor with New York City Public Schools” BOP CCERS Phase III
The STEM Collaboratory NYC®
Lauren Birney, Pace University New York lbirney@pace.edu
(Photo Credits; Scape, Pete Malinowski , BOP and Artistic Staff and Benjamin Von Wong)

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