



# FloodNet

## Hyperlocal, Street-level Flood Monitoring in New York City

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***Town + Gown NYC Water In and Water  
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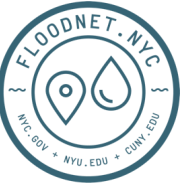
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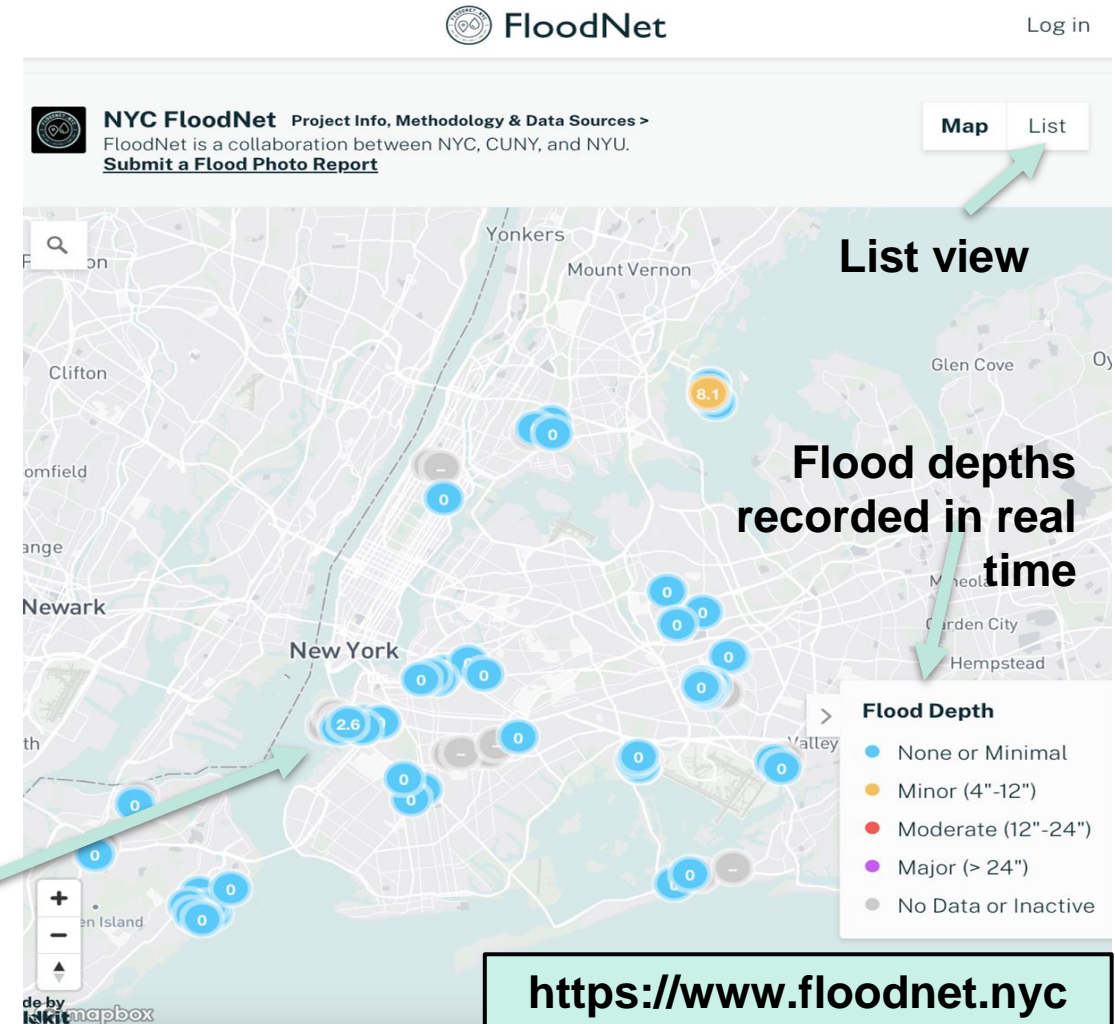
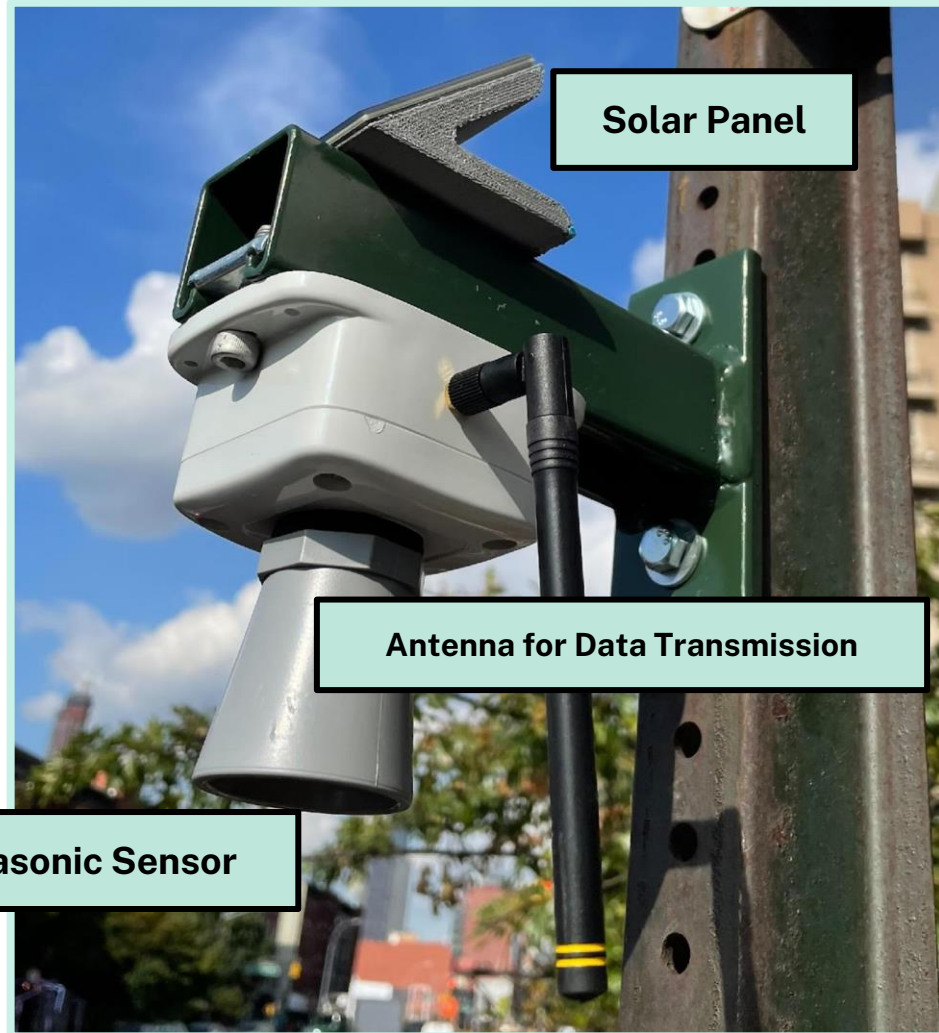


# Presentation Outline

1. Overview of the FloodNet NYC Project
2. Data Tools + Community Connection
3. Community Engagement: Approach
4. Community Engagement: In Practice
5. Upcoming CE Opportunities



# FloodNet NYC: Project Overview





# FloodNet NYC: Project Overview

## Input

Flood sensors installed in flood-prone neighborhoods automate data collection for flood events. This includes the occurrence, location, and severity of flood events over time.

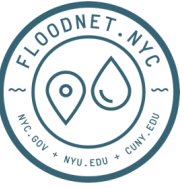
## Outcome

Access to our openly available flood sensor data can be useful to not only city agencies and researchers, but also community residents, organizations, and coalitions in understanding how flooding impacts their neighborhood, exploring how flooding is connected to other relevant community issues.

## Impact

Increased understanding facilitates communities' ability to create action strategies and sustainable practices leading toward greater flood resilience.





# FloodNet NYC: Project Overview

## Guiding Principles

**Project principles ground the connection between the tools we develop, the community engagement practice we engage, and the partnerships we cultivate.**

1. Equity + Accountability
2. Openness + Transparency
3. Accessibility + Usefulness
4. Collaboration + Community
5. Relevance + Credibility
6. Sustainability + Integrity





# Tools as Touchpoints for Community Connections

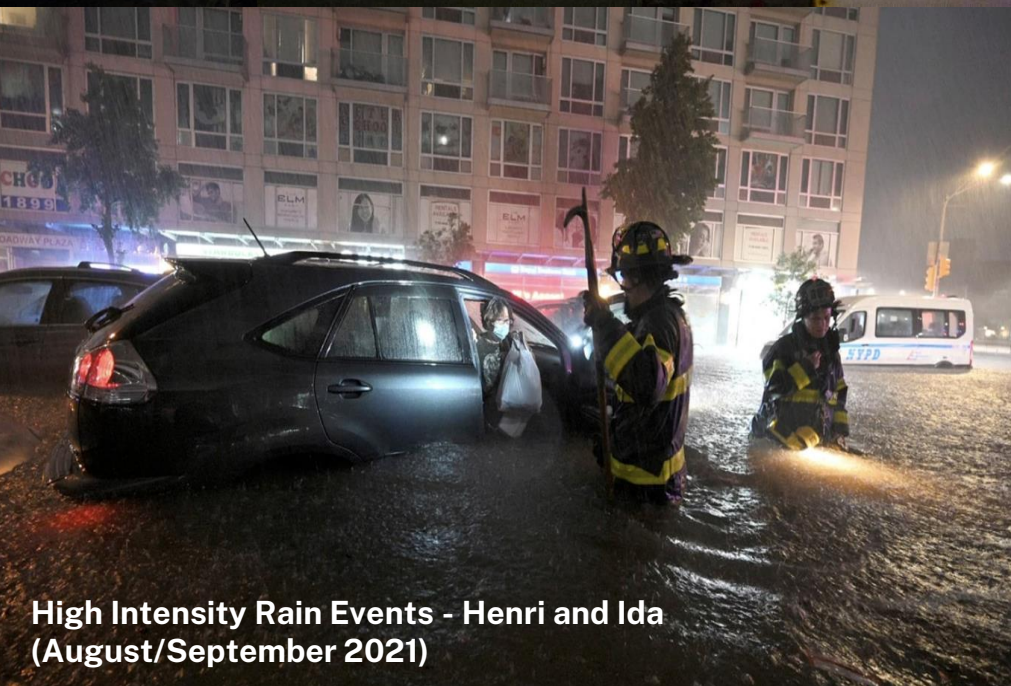
**Our key goal is to measure street flooding in real time!**

- The Sensor Network
  - real-time information about presence, frequency, and depth of hyperlocal street-level flood events
  - information collected by the sensors can help make critical decisions
  - locations informed by community feedback, City partners, & ongoing research into flood exposure and vulnerability across the City
- The Data Dashboard
  - Public facing tool for data dissemination and outreach
  - Sensor outputs become tools for community members to advocate for solutions
  - Shaped by ongoing feedback from community partners and other key stakeholders





Storm Surge – Hurricane Sandy (October 2012)



High Intensity Rain Events - Henri and Ida  
(August/September 2021)



Frequent coastal flooding  
caused by high tides during  
new/full moons





# Community Engagement (CE)

Informed by community-based participation research methodology and implementation frameworks, **our CE strategy has three prongs - community outreach, community education, and community action** - and leverages a public health lens to ground our approach in both theory and practice.

# Community Engagement Goals

## Community Outreach

- Raise awareness of project goals and current initiatives
- Facilitate direct information sharing of real-time data with key community stakeholders

## Community Education

- Develop internal team knowledge about flood-prone neighborhoods and potential uses for FloodNet data.
- Cultivate and sustain collaborative practices of information sharing and action

## Community Action

- Contribute our data, learnings, and evidence-based practices to various flood-related efforts and climate justice initiatives around the City
  - *including through collaboration with partner like the Community Flood Watch project.*



# Community Engagement (CE): Outreach



CE engages outreach to connect with stakeholders to learn about their experience with flooding, identify areas prone to flooding, encourage feedback to inform sensor deployment, and build relationships.

- occurs with communities across the city through presentations, community meetings, workshops, community walkthroughs, 1:1 community conversation and feedback sessions, as well as other community-building efforts.*





# Community Engagement (CE): Outreach

Key dissemination materials for speakers of other languages translated in top ten NYC languages: Arabic, Bengali, Chinese, French, Haitian Creole, Korean, Polish, Spanish, Russian, and Urdu.

Potential Partners Contacted: 459

Potential Partners Connected: 32

Partners Confirmed: 35

Press mentions: 42

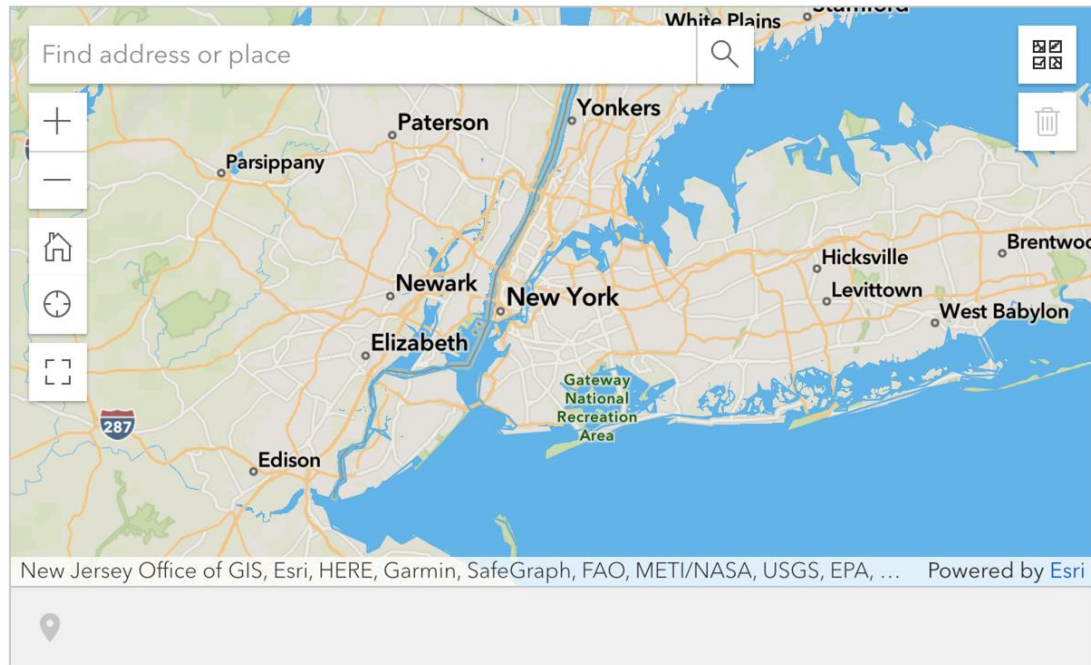
*\*since April 2023*



# Community Engagement (CE): Outreach

Please select your suggested sensor location on the map below:

You can select a location by zooming in and dropping a pin or by searching for an address via the search bar.

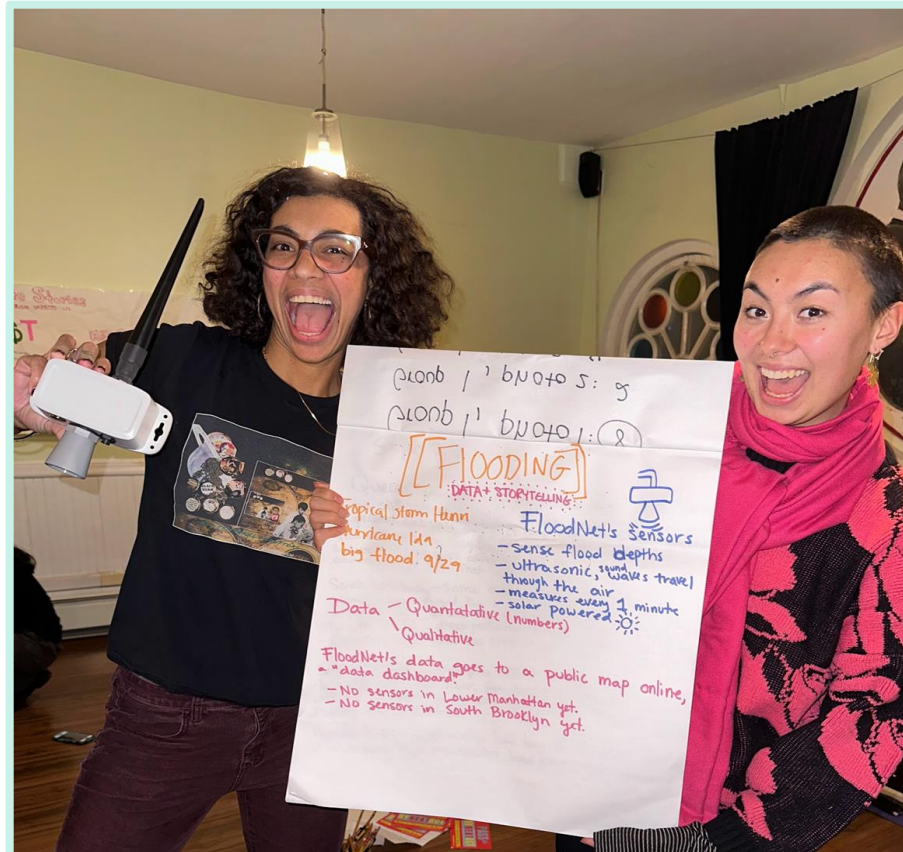


QR code to suggest sensors

**FloodNet has a mandate from NYC DEP to install 500 sensors over the next few year.**

Sensor placement is informed by requests we collect from NYC residents, city government, and researchers. We analyze these requests alongside predicted flood maps and other indicators of flood risk and vulnerability.

# Community Engagement (CE): Education



CE education seeks to engage partners and other stakeholders interested in participating in hands-on learning opportunities, offering regular feedback, and collaborating on educational programming and materials.

- *developed the FloodNet Community Workshop Series which offers three distinct learning modules in sensor technology, FloodNet data access and interpretation, methods of data collection, and dialogue about community priorities related to flood resilience*





# Community Engagement (CE): Education

## 3 Modules Available

- Community Voice Module:
  - *participants introduced to PhotoVoice training to expand community-led documentation, conversation, and qualitative data collection on flooding and flood impacts in their neighborhoods*
- Data & Storytelling:
  - *participants are led through learning activities that facilitate their ability to interpret flood sensor data and communicate their findings through creative storytelling.*
- Sensors & Sensing:
  - *participants with the flood sensor technology and encourage participant reflection on how flooding impacts their neighborhoods*

**Upcoming Events & Workshops**  
*Intended support outreach and community feedback for acceleration of sensor deployment across NYC.*

*Flatbush/Prospect Park South, Brooklyn  
Jamaica/South Jamaica, Queens  
Harlem/East Harlem, Manhattan*

# Community Engagement (CE): Education



Last Updated: October 2023

## FLOODNET NYC

A NETWORK FOR REAL TIME URBAN FLOOD MONITORING AND COMMUNITY RESILIENCE

### WHAT IS FLOODNET?

FloodNet is a cooperative of communities, researchers, and New York City government agencies working to better understand the frequency, severity, and impacts of flooding in New York City. We especially focus on neighborhoods that are vulnerable to high tides, storm surge, and stormwater runoff.

### ACCESS OUR DATA.

Our data dashboard collects real-time data from our flood sensors and can be viewed at [www.floodnet.nyc](http://www.floodnet.nyc).

### OUR FLOOD SENSORS.

Flood sensors monitor flooding in NYC neighborhoods. They collect information that is used by local residents, researchers, city agencies, and others to better understand how flooding impacts NYC communities. They are not cameras and do not collect identifying information.

### HOW TO GET INVOLVED.

If you experience flooding in your neighborhood, send suggestions for potential sensor locations. **Contact us via our website: [www.floodnet.nyc](http://www.floodnet.nyc)**

### HOW TO STAY CONNECTED.

Talk with our Community Engagement Manager about the project, collaboration, or meetings with your team. **Email [info@floodnet.nyc](mailto:info@floodnet.nyc) now!**

### HELP COLLECT FLOOD DATA.

To submit a flood report with a photo, time, depth, location and impacts, download the 'MyCoast' app, register, and add a 'Flood Watch' report: [mycoast.org/ny/flood-watch](http://mycoast.org/ny/flood-watch)

### WHO WE ARE.

FloodNet began in 2020 as a partnership between academic researchers at NYU and CUNY, and NYC agencies, including the Mayor's Office of Climate & Environmental Justice, NYC Department of Environmental Protection, and the Mayor's Office of Technology & Innovation.

### QUESTIONS OR FEEDBACK?

[info@floodnet.nyc](mailto:info@floodnet.nyc)  
[www.floodnet.nyc](http://www.floodnet.nyc)



## FloodNet NYC

### Neighborhood Profile: Canarsie, Brooklyn

Canarsie is a neighborhood in Brooklyn, NYC that was historically named for the indigenous people who inhabited the land. It is most identified by its residential homes, waterfront views, and fusion city living. Due to its location and position within the Jamaica Bay watershed, Canarsie faces recurrent flooding, exacerbated by the impacts of climate change. Despite ongoing efforts to address this problem, Canarsie continues to grapple with severe flooding, posing a significant threat to the neighborhood and its residents.

#### Geographical Location

Situated in Jamaica Bay, Canarsie's boundaries include the Fresh Creek Basin in the northeast, and Paerdegat Basin in the southwest. To the north Canarsie is bordered by Linden Boulevard and Ralph Avenue to the west. As severe storms drop high amounts of water into Fresh Creek and Paerdegat Basin, quick nearby are affected by them overflowing.

#### Quick Facts

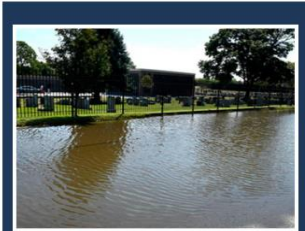
- As of 2021 Canarsie's population is at 196,219.
- Based data from the NYU Furman Center, community residents primarily identify as Black (55.7%), white (20.4%), Asian (6.3%), and Hispanic (9.2%) populations.
- In 2021, the income diversity ratio was 4.6, indicating a moderate level of income diversity in the neighborhood, with a range of income levels represented.
- Housing units and rental vacancy rates have been slightly decreasing from 2019-2021.

#### Flooding in Canarsie, BK

- Stormwater or Pluvial Flooding**
  - Stormwater flooding most often occurs when precipitation, accumulates in the city faster than it can drain out through our stormwater drainage systems, e.g., Hurricane Ida in 2021.
  - Lack of sewage capacity has led to combined sewer overflows, causing untreated sewage and stormwater to infiltrate the environment and people's homes during heavy rain events.
- Coastal Flooding**
  - Coastal flooding can occur during coastal storms (e.g., hurricanes, tropical storms, Nor'easters) when water from the ocean surges towards the land and come up and over the coastline due to winds and other forces.
  - Canarsie is particularly vulnerable to coastal flooding since much of the residential land sits on infilled marshland.

#### Key Flood-related Projects

- Flood Protection Project (2021): Enhancing flood protection with tidal gates.
- Sewer Upgrade Project (2022): Upgrading sewer lines to reduce flooding.
- Wetland Restoration (Ongoing): Restoring wetlands at Fresh Creek Nature Preserve.
- Tidal Gates (Ongoing): Installing tidal gates to prevent debris in sewage.
- Adopt a Catch Basin (Ongoing): Volunteer program to keep drains clear.
- Sewer System Separation (Ongoing): Separating combined sewer systems for better drainage.



(Source: Brooklyn Paper, 2017)

#### Community Stories

"And water does flow in different ways throughout that street. It has nowhere to go. At one point it does enter the cemetery at our driveway. I'm not an engineer, I don't know how it has to be addressed, but somebody needs to see it because that is standing water there."

(Related to community concerns about flooding on Church Lane above, Source: Brooklyn Paper, 2017)

The combination of degraded sewers, being surrounded by three bodies of water, as well as the rise in extreme weather events resulting from the climate crisis, makes this community particularly vulnerable," Jeffries said. "That's why it was so important in this first round of funding to fight hard to secure support for the tide gate project."

(Related to tidal gate installation in Canarsie, Source: Brooklyn Paper, 2022)

#### Suggest Locations for Flood Sensors

Flood sensors monitor flood events at the street-level in order to contribute to a deeper understanding of how flooding impacts flood-prone NYC communities. Currently, we are looking to get more suggestions from the community about cross-streets where flooding is happening. This helps the FloodNet NYC team to cross-reference and validate information we are learning from our academic collaborators and DEP. Recommend sensor locations using the QR code here.



Educational materials offer residents accessible and relevant information in multiple languages to keep them informed about FloodNet.

Community outreach events foster direct interactions, build relationships, and address local concerns and needs.

Community profiles provide a concise and accessible resource for information sharing and collaboration.



# Community Engagement (CE): Action



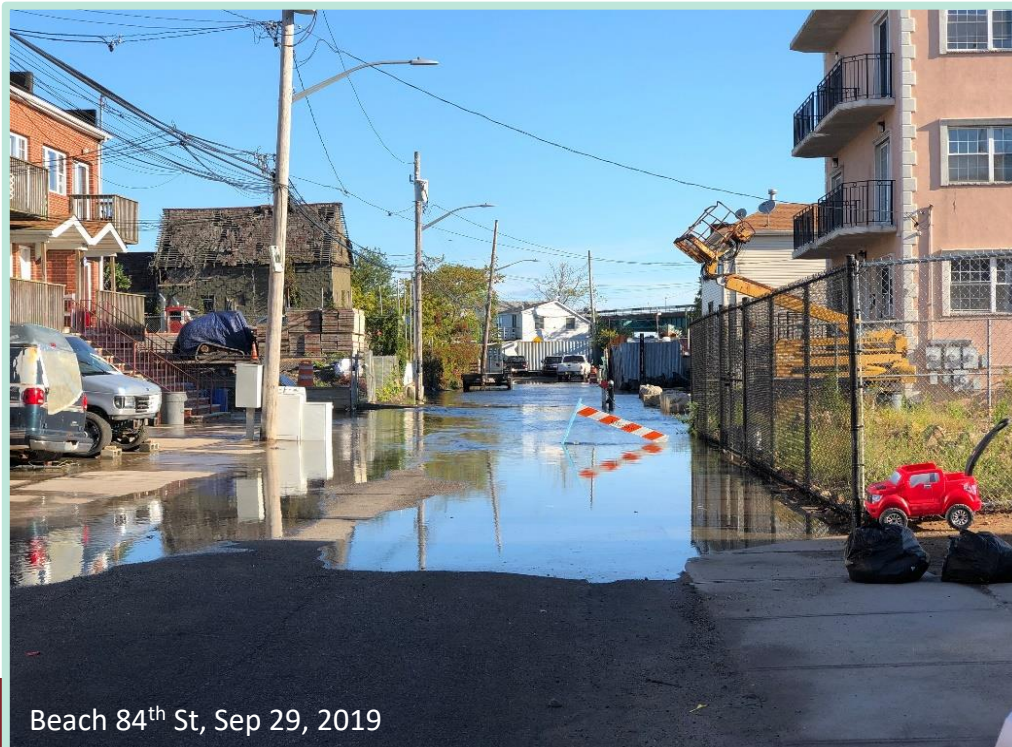
CE efforts toward community action primarily to encourage and create opportunities for collaboration with partners to continue conversations about flood data and support community-building efforts.



# Community Engagement (CE): Action

Documenting local flooding since 2018:

## Jamaica Bay Community Flood Watch Project

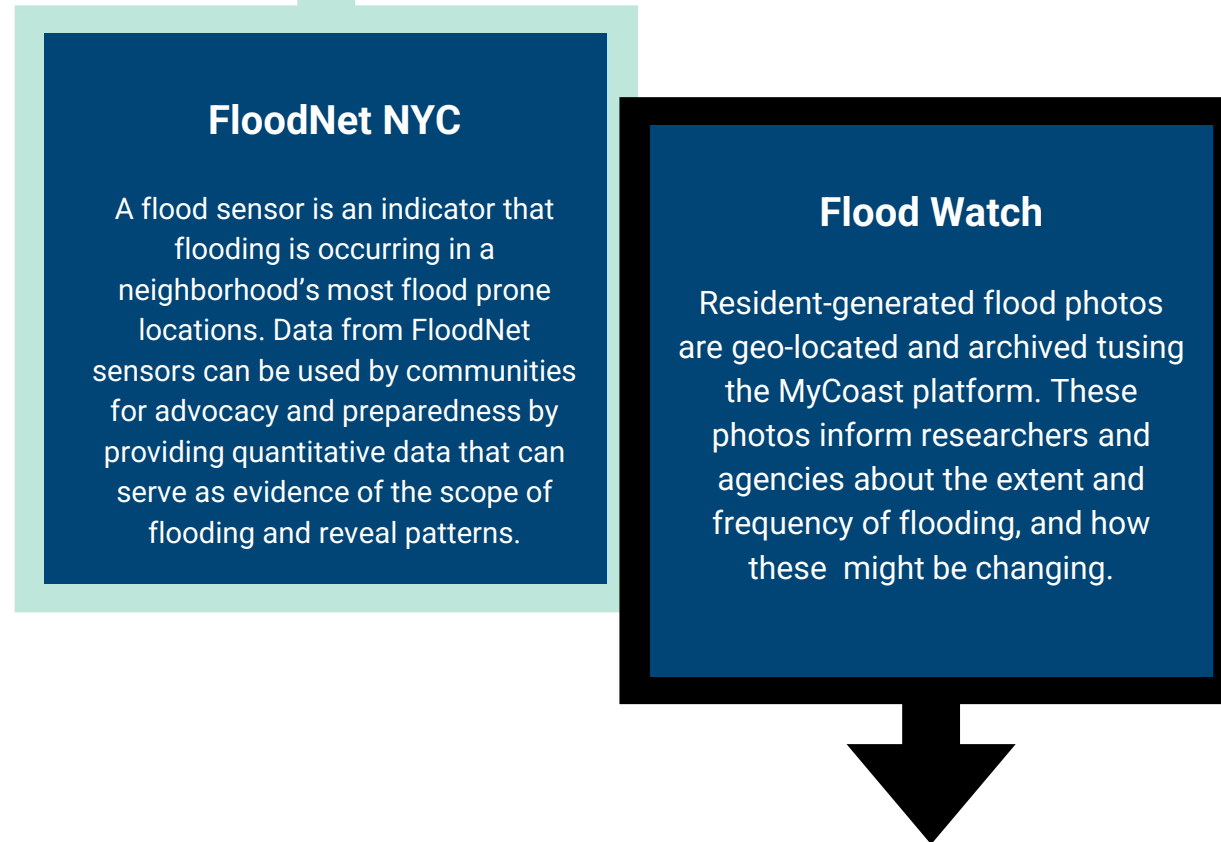






# Community Engagement (CE): Action

*The partnership with FloodNet is an example of how powerful these connections can be:  
Flood Watch was a founding partner of the FloodNet NYC project.*

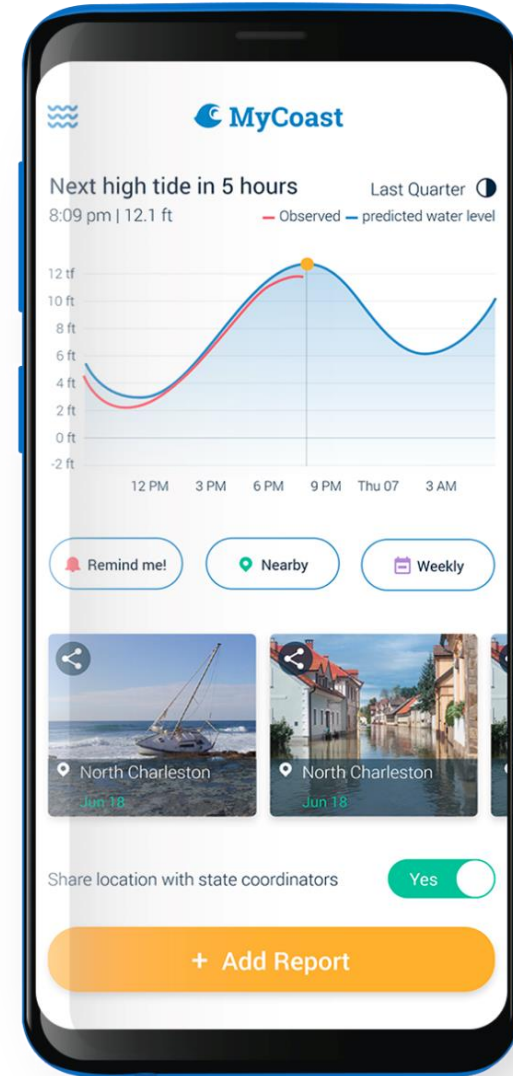


*Sensors cannot show every area where flooding occurs; they monitor the places directly below them. Photos illustrate what it means for a community when flooding occurs: where it happens—beyond the sensor—how it's changing, and what it looks like.*

# Community Engagement (CE)

Volunteers submit photos of flooding to provide better understanding of the problem:

[www.mycoast.org/ny/flood-watch](http://www.mycoast.org/ny/flood-watch)





# Upcoming Community Meet

**FloodNet Community Partner Monthly Meet | CE Office Hours**  
**Friday, February 23rd, 12:30pm EST | Location: Zoom**

FloodNet's Community Engagement Team invites its core community resident and organizational partners to a virtual public monthly meeting to discuss partner updates, neighborhood happenings, project feedback, sensor locations, FloodNet CE efforts, and co-produced community-focused educational materials.

*This standing meeting will be held as an office hour, allowing partners to join and leave the meeting as their schedules permit. We look forward to connecting and building together!*

Email [info@floodnet.nyc](mailto:info@floodnet.nyc) for more info.





# Upcoming Community Meet

## FloodNet Community Sessions + Data & Storytelling Workshop

**Friday, 3/15, 6:00-9:00 pm EST | Location: Flatbush Central Marketplace**

Join us to meet the FloodNet team and learn about our efforts across NYC! Connect with community members, learn to read our flood sensor data and communicate findings through creative storytelling.

*FloodNet's Data & Storytelling Module engages community participants in a co-learning experience that supports community-led data analysis. Community participants are led through learning activities that facilitate their ability to interpret flood sensor data and communicate their findings through creative storytelling. The stories both highlight participants' lived experiences with flooding in their area and offer qualitative information to contextualize flood sensor data.*

RSVP not required but welcomed! <https://floodnet-formnyc.eventbrite.com>

## Funding Sources:



### **New York University**

Andrea Silverman, Charlie Mydlarz, Elizabeth Henaff, Tega Brain, Amanpreet Kaur, Bea Steers

### **CUNY Advanced Science Research Center**

Ricardo Toledo-Crow, Praneeth sai venkat Challagonda, Kendra Krueger

### **Science and Resilience Institute at Jamaica Bay (Brooklyn College) + New York Sea Grant**

Brett Branco, Véronëque Ignace, Hannah Eisler Burnett, Polly Pierone

### **NYC Mayor's Office of Climate & Environmental Justice**

Hayley Elszasz

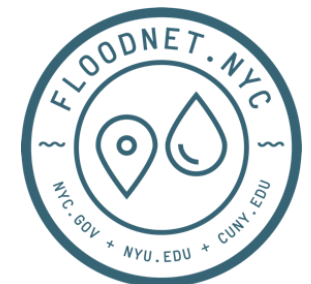
### **NYC Office Technology & Innovation**

Paul Rothman, Briana Garcia

+ student researchers at NYU and CUNY

## **Thank you to community group partners, including:**

Citizens Committee of New York City  
Sixth Street Community Center  
Little Haiti BK  
Little Caribbean (CaribBEING)  
Brooklyn Movement Center  
Brinkerhoff Action Association  
The Campaign Against Hunger  
El Puente Bushwick Leadership Center  
Canarsie Community Development Inc.  
Wyckoff Farmhouse Museum  
City Island Rising  
Pleasant Village Community Garden  
Edgemere Community Civic Association  
Far Rockaway Arverne Nonprofit Coalition  
Cunningham Park Farmers Market (Down to Earth)  
Gowanus Canal Conservancy  
Meyers Emergency Management Group  
Hamilton Beach Civic Association  
Red Hook Initiative  
Pioneer Works  
Rockaway Initiative for Sustainability and Equity (RISE)  
Bronx River Alliance  
South Beach Civic Association  
Nonprofit Staten Island (SI COAD)  
Community Emergency Response Team  
Queens Memory Project  
Queens Library at East Elmhurst  
Waterfront Alliance (Rise to Resilience)  
Van Cortlandt Park Alliance  
Together We Can Community Resource Center



<https://www.floodnet.nyc/>