PILOT NYC Policy Studio

Pilot Pitchfest

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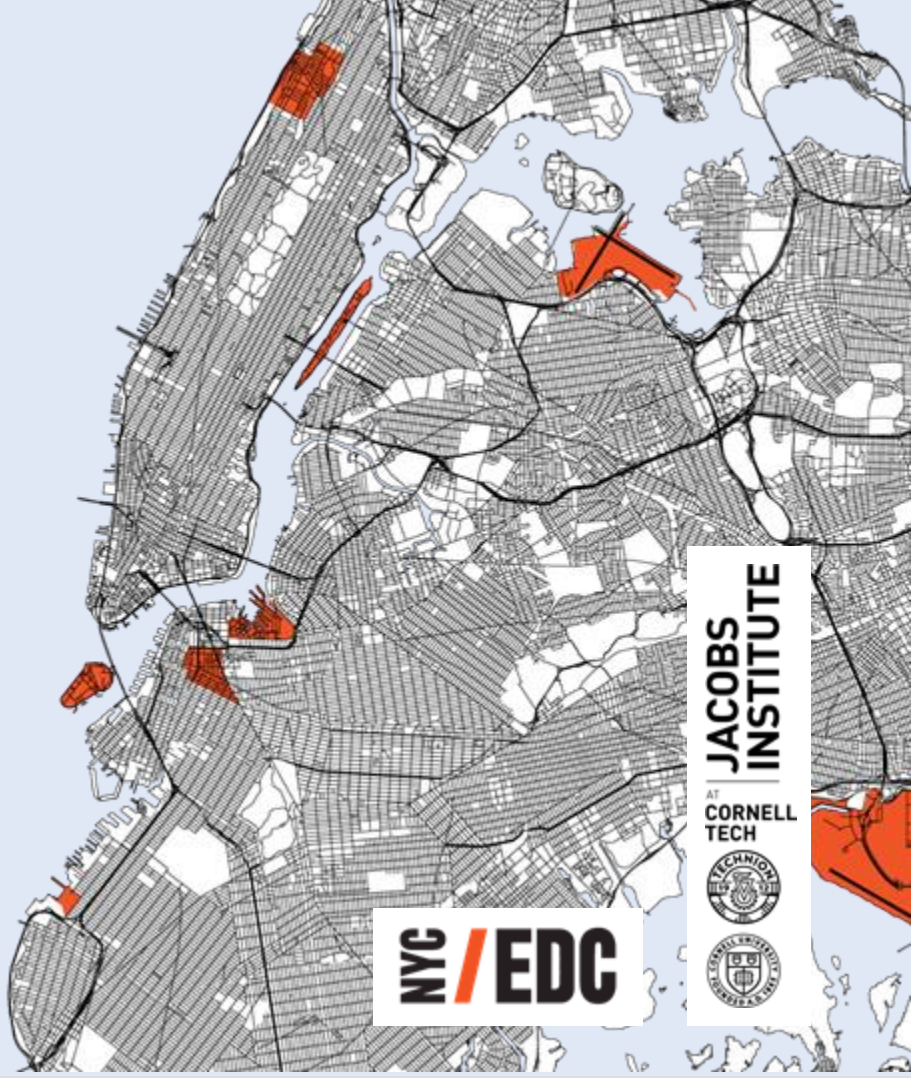
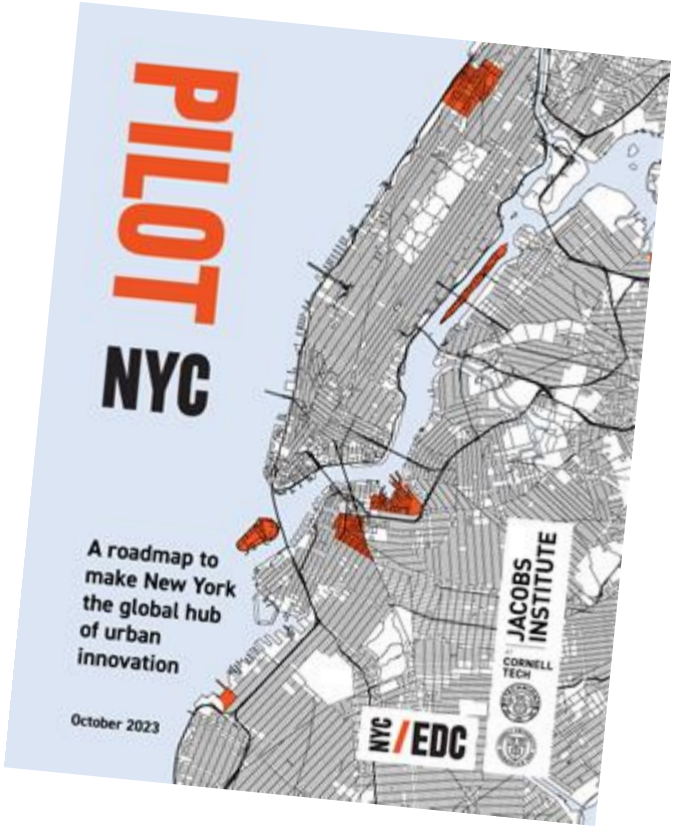


Pilot:New York City – *read the report*



Three *Pilot:New York City* Programs

01 First, the City should enhance its own **innovation capacity** through supporting innovation personnel at agencies and initiating more direct collaboration with local universities, to ensure that promising pilots transition to procurement orders and policy changes.

02 Second, the City should pursue **procurement modernization** by codifying a "challenge-based" procurement method, allowing agencies to define the problem they are trying to solve and test different technology solutions in the real world, on the path to making a final purchase decision.

03 Third, the City should enhance its **support infrastructure for urban innovation startups** through the convening of a pilot network—a group of accelerators and dedicated pilot sites—that together offer a streamlined point-of-entry for startups launching and growing in New York City.

What is Urban Innovation?

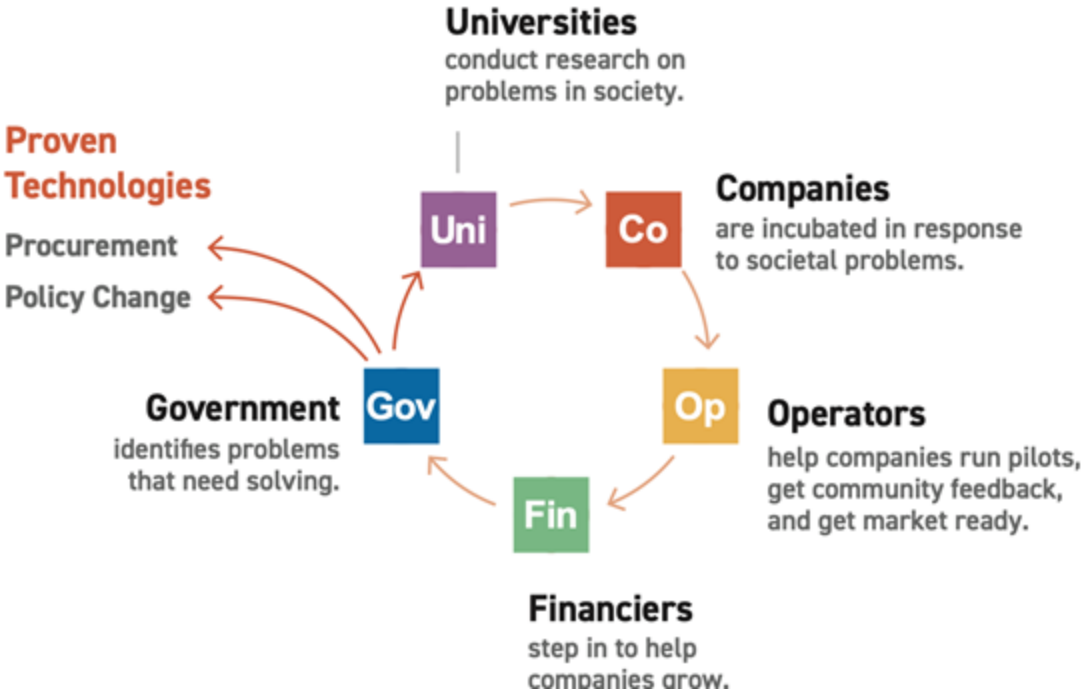
What is urban innovation?

The adoption of technology aligned with public interest in cities

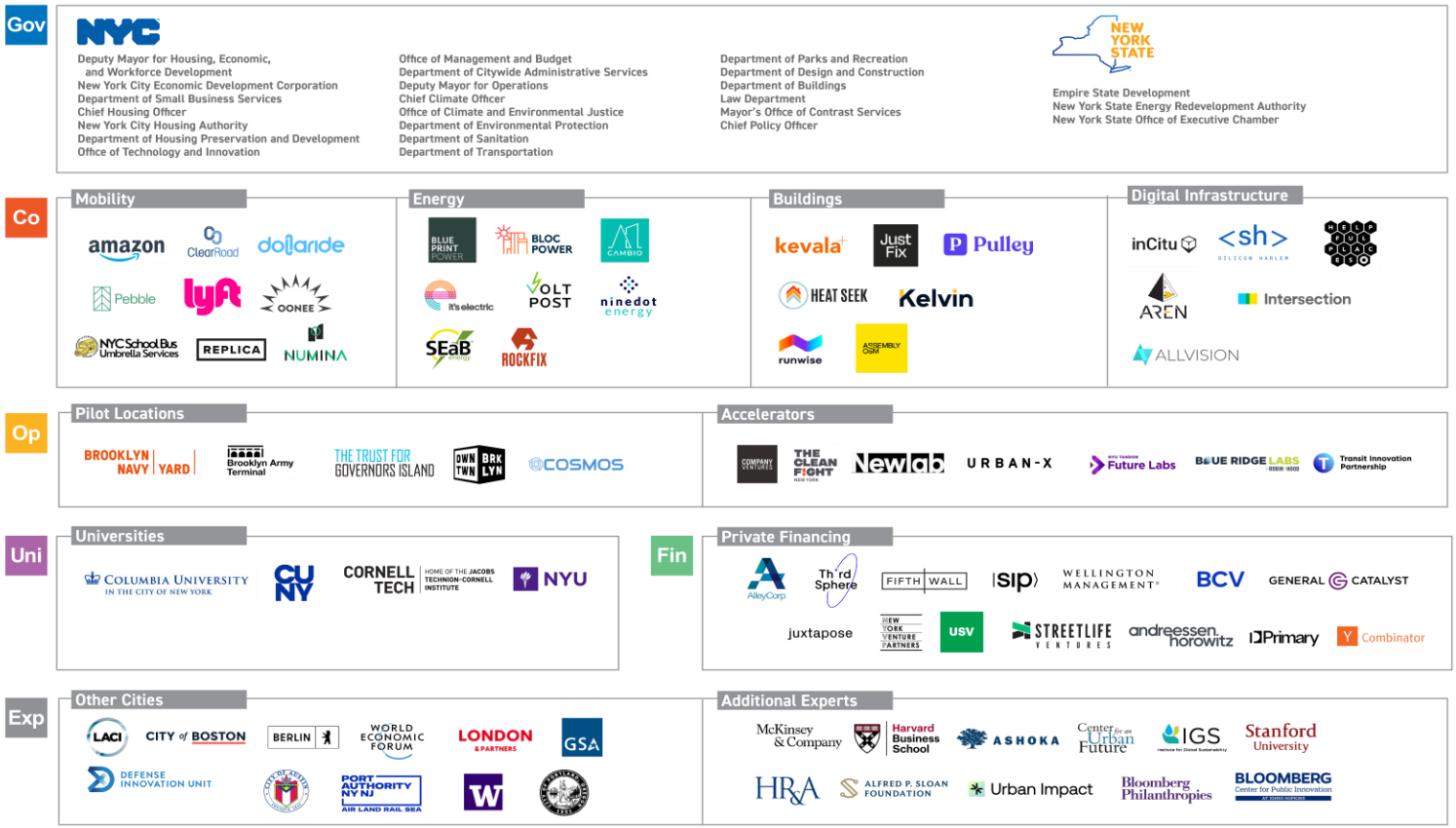
What was your focus?

Buildings, energy, mobility, and digital infrastructure

The "Happy Path" Urban Innovation Ecosystem

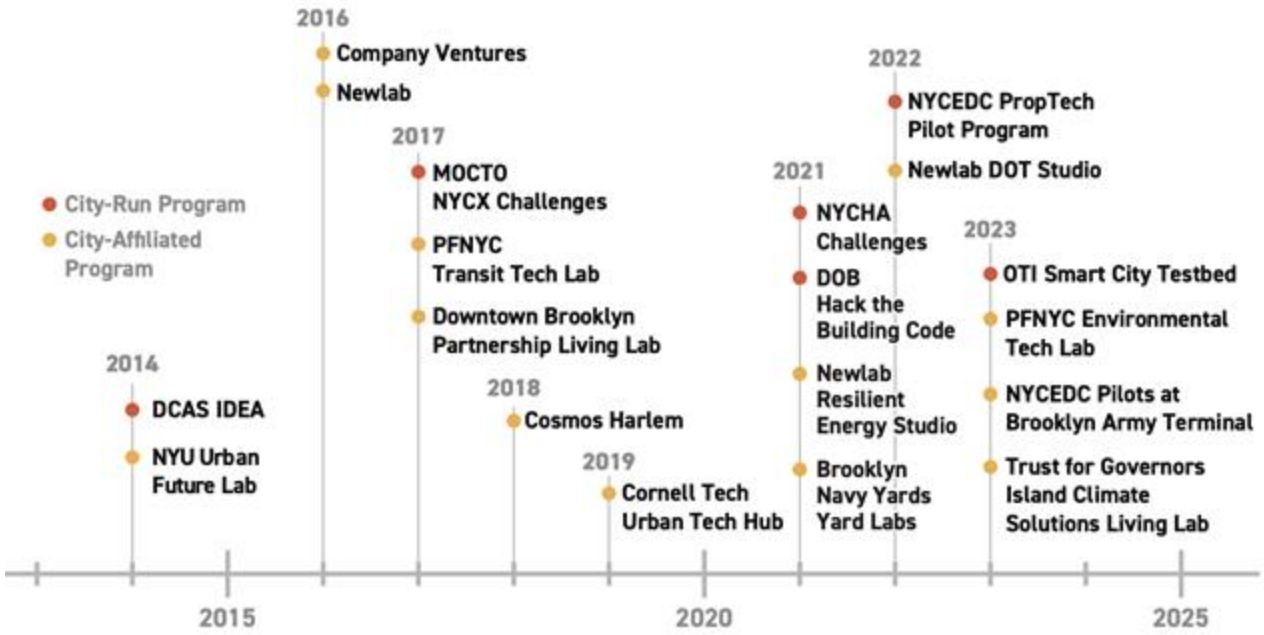


Our Research



New York City's Recent Urban Innovation History

Timeline of City-Run and Affiliated Piloting Programs

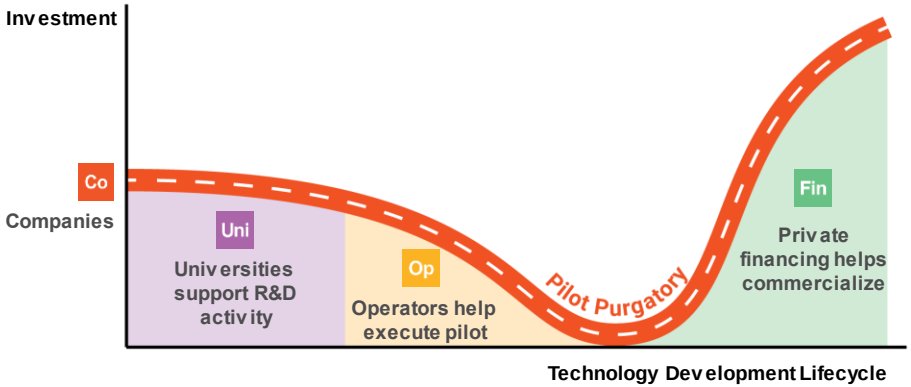


600+ companies
formally applied to pilot their products in the City of New York last year.

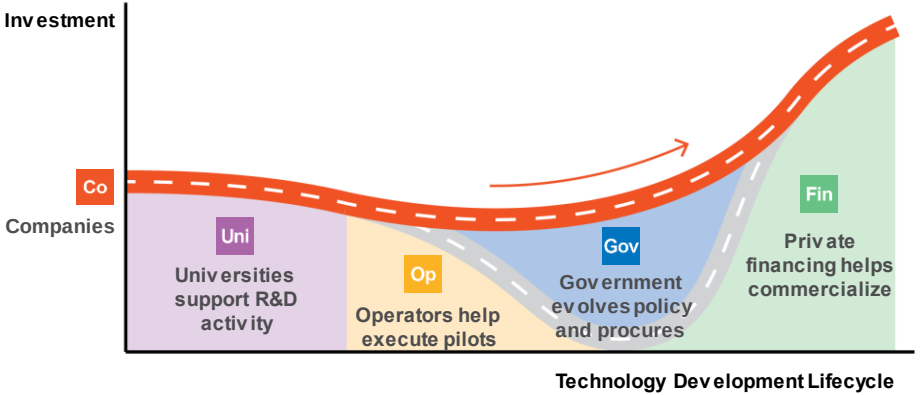
50+ pilots
occurred through a City-run or -affiliated program.

The Problem of "Pilot Purgatory"

Current State



Future State

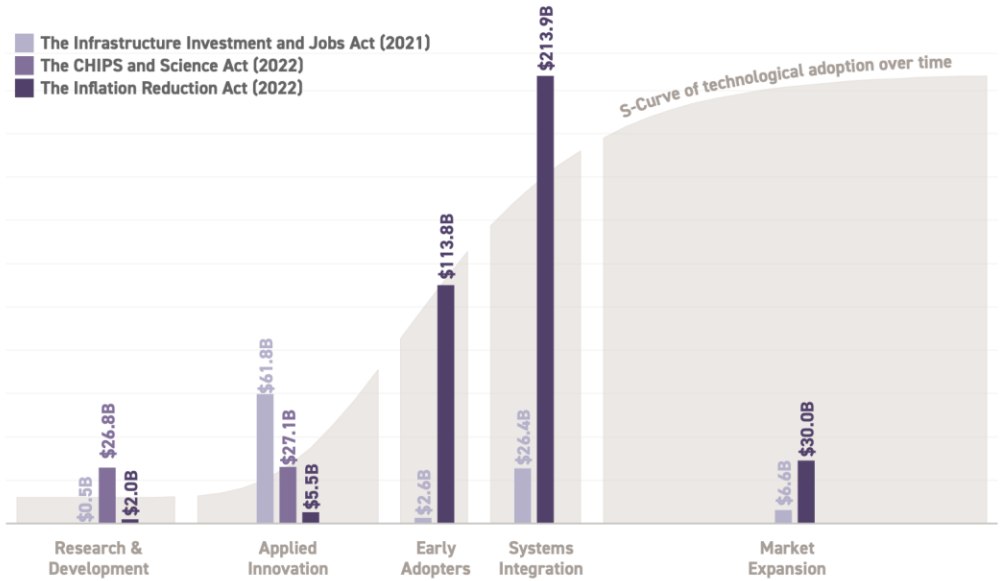


Why Now?

New York is committed to achieving net-zero emissions by 2050, but most technology we need to achieve net-zero emissions is still early stage

Figure 6: Total Projected Federal Spending on Climate in the IRA, the IIJA, and the CHIPS Act Mapped to Technology Readiness Level.

Most government spending on climate is going to technologies early in the innovation "S-Curve," a framework that is commonly used to chart the market acceptance of technology.

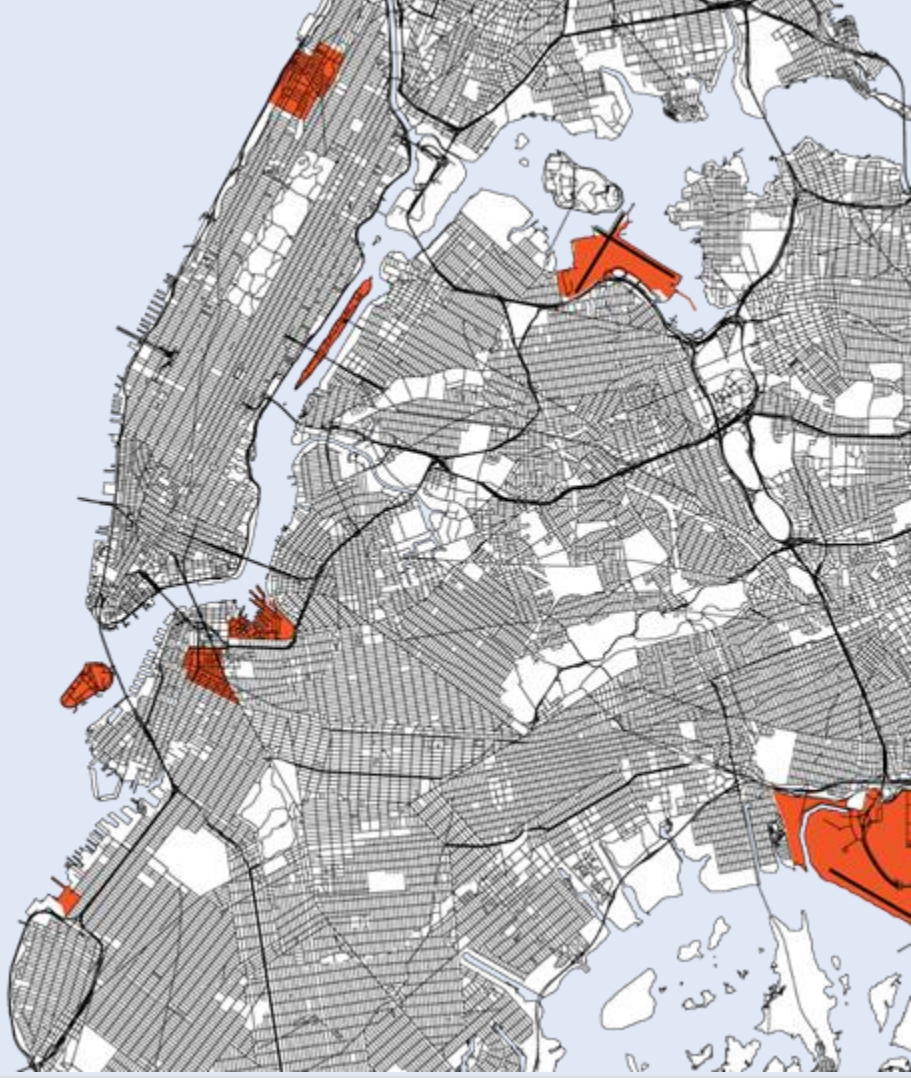


Citation: Rocky Mountain Institute estimate derived from Congressional Budget Office data as of September, 2022. Actual spending may vary from projected spending.

Pilot: New York City Plan

		Project 1 **Bolster Government Innovation Capacity**	Project 2 **Modernize City Procurement Processes**	Project 3 **Coordinate Startup Support Infrastructure**
Challenge		Across the New York City government, there is a strong desire to innovate, which often clashes with the reality of risk-averse processes, limited resourcing, and a shortage of technical staff. Most agencies are focused on basic service delivery, and do not have the capacity to transition pilots into proven, long-term solutions.	In New York City today, most pilots are run through "no-cost," "micro-purchase," or "demonstration project" procurement pathways. These procurement methods allow for relatively fast testing, but they do not create a legal pathway to scale successful technologies, perpetuating the issue of pilot purgatory.	While urban innovation companies want to be located in New York, many struggle with the process of "going to market" in the city. Through the Department of Small Business Services, New York supports retailers interacting with the City—but it is not equipped to handle the needs of urban innovation startups navigating activities like government permitting.
Opportunity		Central innovation teams have become popular across government, acting as "centers of excellence" serving agencies. In New York City, the Office of Technology and Innovation has launched a critical new program to support agency piloting. Due to New York's scale, the program will be most impactful if supplemented by on-the-ground innovation leads in key agencies.	There is a growing reform movement toward "challenge-based" procurement, in which an agency invites vendors to propose creative solutions to a challenge it is facing. The agency then pilots its preferred solutions, to inform a final purchase decision. The New York City Housing Authority has begun using challenges—creating a possible model for other agencies.	A network of pilot programs and dedicated sites, like Newlab and the Brooklyn Navy Yard, have emerged as mediators between companies, the government, and the public, acting as a first point of entry to New York. However, there is more demand from startups than current programs can accommodate. NYCEDC, which seeded this ecosystem, is poised to step up and respond to startup needs.
Recommendation		Leverage the excitement associated with PlaNYC into financial and technical support for innovation leads in key City agencies, to work on pilot projects associated with addressing climate change. Collaborate with local universities to define, scope, and validate pilots, bringing in third-party expertise.	Issue a new "challenge-based" procurement pathway for a five-year trial and create training to help agencies understand their pilot procurement options, including associated cyber and privacy policies. Propose and pass any necessary Procurement Policy Board changes to create a long-term legal structure for future challenge-based purchasing.	Launch a central business portal that would provide services to help urban innovation startups navigate New York. Pool resources and raise funding for a formalized network of pilot programs and sites, which would match supply and demand, and provide support on issues each player is too small to address individually (e.g. policy reform, debt financing).
Proposed Activities	Year 1 (2024)	• Empower and embed innovation leads in key City agencies • Trial program for universities to provide technical support on pilots	• Trial challenge-based procurement with ~2 City agencies • Develop pilot procurement, cyber, and privacy training for agencies	• Launch a portal with resources for startups "selling to or in" the City • Formalize a network of pilot programs and sites
	Year 3 (2026)	• Enhance and expand innovation support to additional City agencies • Establish system to measure and incentivize outcome-oriented pilots • Help guide academic R&D activity toward City priorities	• Establish permanent challenge-based procurement pathway • Harmonize language with New York State to enable cooperative buying	• Create a feedback loop with City agencies on emerging policy issues • Structure new financial products to support CapEx on pilot projects • Set up a Zero-Emission Test Zone in a Justice 40-designated area

Policy Studio



The Pilot Policy Studio

"There must be a better way of matchmaking between the City's problems and the wealth of researchers you have in New York City. A small bit of cash, a templatized contract, and some central coordination would go a long way."

- *Academia Roundtable*

What is the Studio?
The trial of a new program to pair New York-based academics with State and City government agencies to work together on urban technology pilots in the City of New York.

What is the goal?
Utilize the strength of local research universities to help government agencies design meaningful technology pilots with strong evaluation criteria, validate the results, and publish policy recommendations and findings.

What is the funding opportunity?
Up to $80,000 in catalytic funding in 2024 from the Sloan Foundation to support at least one academic-agency pairing. However, we also hope to provide in-kind support to other pairings.

What is a pilot?

Eligible Pilots For Funding

<6-month test intended to evaluate technology at the *category* level (not the company-level).

Priority pilots:

1. Test underlying technology that aligns to one of the NSF's ten priority areas for technology research.

1. Are aligned to Pilot:New York City's focus area of mobility, buildings, energy, digital infrastructure.

Pilot Examples

Using Drones to Deliver Cargo:
The Port Authority of New York and New Jersey piloted the use of drones to deliver cargo between New Jersey and New York City.

A Shared E-Scooter Program:
The Department of Transportation piloted a shared e-scooter program that brought 3,000 Bird, Lime and Veo e-scooters to the East Bronx.

Roadside Sound Meters and Cameras:
The Department of Environmental Protection piloted using roadside sound meters and cameras to capture evidence of vehicles emitting noise in violation of New York State's Vehicle and Traffic Law and the City's Noise Code, for the purpose of automated ticketing.

What are the outputs?

First, a public report covering the results of the chosen pilot and associated policy recommendations and findings. Our intention is to develop a template format, which could be used on future pilots.

Second, an op-ed, extrapolating lessons from the pilot to inform public policy. An op-ed is an indirect means of increasing the profile of the work and influencing policy.

Third, as a “stretch” deliverable, we would publish a short-form legal template that academic researchers can use for future collaboration with city agencies.

What is the timeframe?

Near Term

Dec 15th: Complete the Attendee Directory

Interested in submitting a joint application to the Policy Studio? Feel free to reach out to one of the presenters you heard from today. You can also submit without a partner.

Jan 16th: Application Due

Long Term

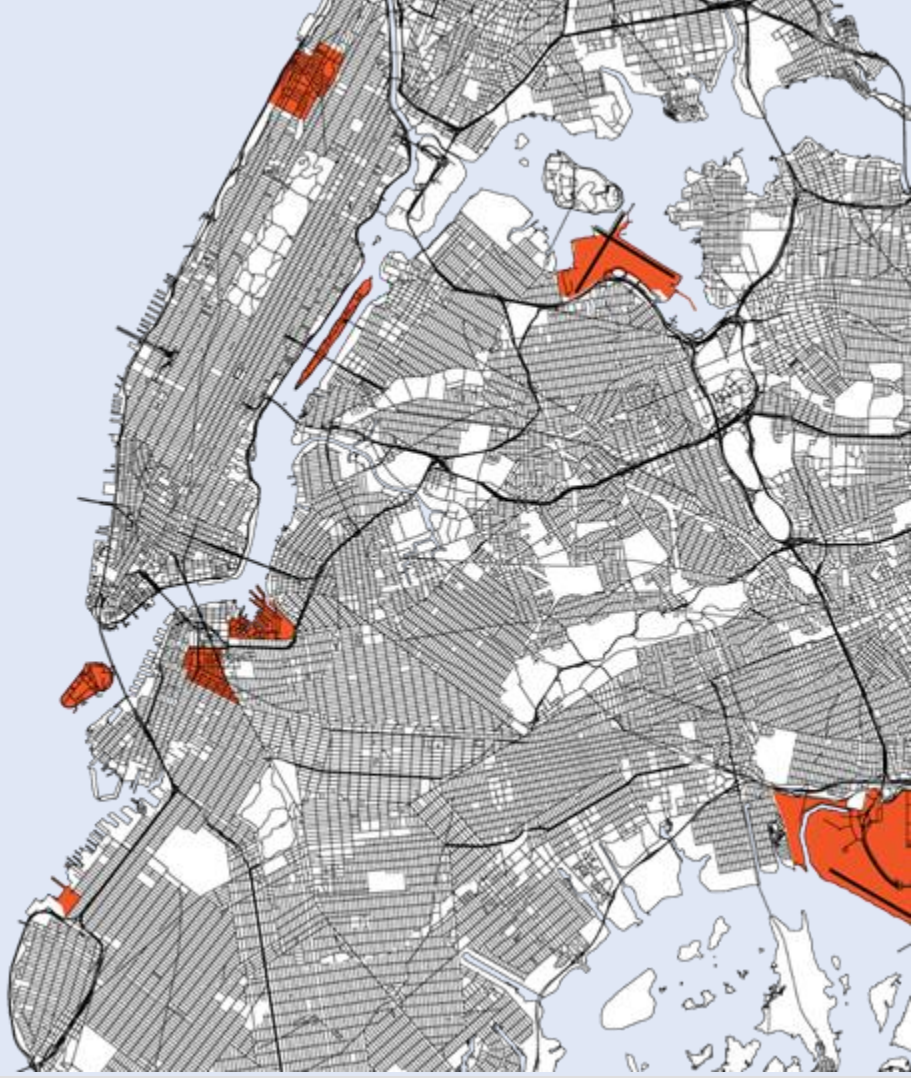
Phase 2: Feb-March, 2024 - Matchmaking and contract negotiation

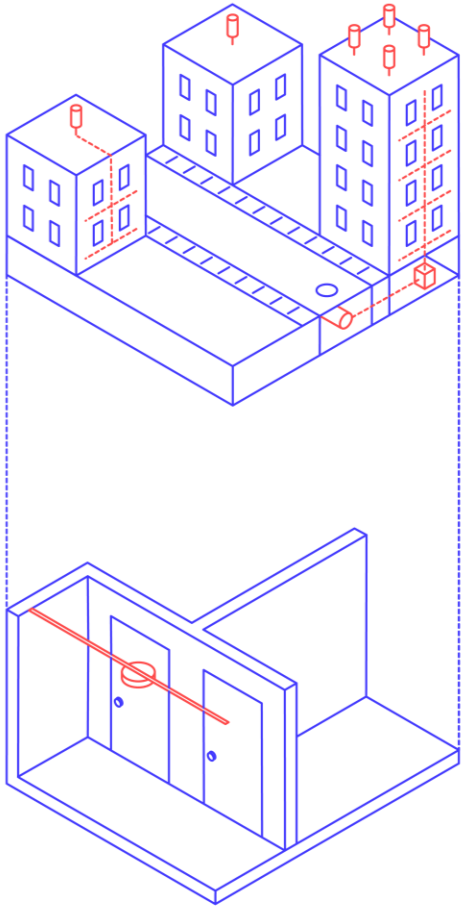
Phase 3: Apr-Aug, 2024 - Pilot performance & validation occurs

Phase 4: Sep-Dec, 2024 - Report is written and finalized

Rolling apps for official government programs: OTI Smart City Testbed, Pilots at BAT, Town & Gown

Agency Pitches





Fast, free internet for all low-income NYers

Dave Seliger, Chief Digital Equity Officer, NYC Housing Preservation & Development

CONCEPT

Problem: One-third of low-income New Yorkers do not have internet access! Many live in neighborhoods that have been "digitally redlined" or purposely deprived of broadband infrastructure.

Technology: We are building a $3M pilot mesh network in the Bronx and Upper Manhattan to provide free internet to Section 8 households who live in private apartment buildings scattered throughout the boroughs.

Research Question: How do we deploy hallway Wi-Fi access points for optimal signal penetration into apartments? How does 1920's-era construction vs 2000's-era impact deployment methodology?

EXECUTION

Collaborator: We are looking for a University collaborator to help us design deployment configurations based on different building typologies. We also need help evaluating the effectiveness of the pilot!

Planning: We are in the process of awarding the RFP. We have spent three years researching, designing, and procuring this pilot.

Vendors: A major non-profit will oversee the pilot and one or multiple MWBE installers will help build the network. We have not yet identified the access point and network backbone infrastructure.

Urban Solar PV – Beyond Rooftops

Jayda Rodriguez, Sr. Program Manager, Innovative Technologies, Department of Citywide Administrative Services (DCAS), Department of Energy Management (DEM)

CONCEPT

Problem: NYC has set a goal to install 100 MW of solar PV by 2030 and requires a lot of real estate square footage to reach this goal.

Technology: We plan to pilot a solar PV building façade in Manhattan.

Research Question: How can we accurately model expected production from a solar system installed vertically on a building façade in dense urban areas? What is the potential to scale up this technology on NYC municipal buildings?

EXECUTION

Collaborator: We are looking for an academic partner to assist with solar production modeling. We also need help developing a post pilot plan to scale this across the 4,000+ municipal sites managed by NYC agencies.

Planning: We have received buy-in from the assistant commissioner's office for solar facades, have selected a manufacturer for procurement, and a site for pilot deployment. We are working on finalizing the scope of work, and are looking into planning a 2nd pilot for solar windows.

Vendors: We are working closely with a manufacturer of solar facades for a aforementioned pilot and are looking at partners for a 2nd pilot for solar windows.

Lise Dorestant


Angel Torres/Queens Daily Eagle

dollarvan.nyc

Making Visible and Measuring the Use and Scale of Informal Transportation

Jack Darcey, Transportation Planner, NYC Department of City Planning

CONCEPT

Problem: Informal transit exists widely in New York City, but few resources capture how, where, and at what scale people use it. NYC DCP is interested in collecting large-scale data on informal mobility to update our understanding of citywide transportation.

Technology: We aim to use detection technology (e.g. cell phone data, traffic cameras, sensors, etc.) to identify informal transit route patterns, ridership, frequencies, flexibility, and safety.

Research Question: What characteristics of informal transit can be studied or measured at a citywide scale? How can technological means be deployed to make visible and measure the utility of informal transit?

EXECUTION

Collaborator: We seek an academic partner to help us harness technology to study informal transit beyond existing qualitative data methods. We wish to create a replicable methodology for continued measurement and modeling.

Planning: This topic has been on our research "wish list" for several years. There is widespread interest at the agency to supplement more traditional data collection methods to paint a comprehensive picture of the variety of mobility in our city.

Vendors: We currently have access to cell phone data through third-party vendors, but are open to working with computer visioning or other sensing technology vendors.


ALL-E/Pressenza

Robi Jaffrey/Shutterstock

Studying the Mobility Landscape of Workers with no Defined Place of Work

Jack Darcey, Transportation Planner, NYC Department of City Planning

CONCEPT

Problem: Workers with no defined place of work remain largely invisible to regulators and scholars, and many may have hesitancies to partnering with government or data collection bodies. This has implications for land use and public realm planning.

Technology: We are looking for data from delivery app companies (order information, delivery tracking data, mode, etc.). We would also like to explore computer visioning and sensor data in capturing mobility patterns.

Research Question: What tools exist to study and interact with the mobility ecosystem of these workers? How, when, where, and at what scale do these workers use public space and the right of way?

EXECUTION

Collaborator: We seek a data-focused academic partner to help us navigate the data availability and methods of harnessing and assigning delivery data to define geographic and temporal patterns.

Planning: We have begun a study on daytime population and new mobility patterns in collaboration with multiple divisions in the agency and with support from leadership. We are working on procurement of cell-phone data but seek supplementary support and data sources.

Vendors: We hope to gain data from third-party delivery app companies and are open to exploring sensors and other computer visioning tools.

Automating audio/visual analysis for air and noise enforcement

Nerissa Moray, Sr Advisor to the Commissioner, Department of Environmental Protection

CONCEPT

Problem: NYC DEP staff review thousands of videos for both noise & air quality compliance and are exploring scalable options to reduce manhours in manual review and tracking software data entry processes.

Technology: Develop/Explore AI/Machine Learning capabilities to automate the A/V diagnosis and results processing.

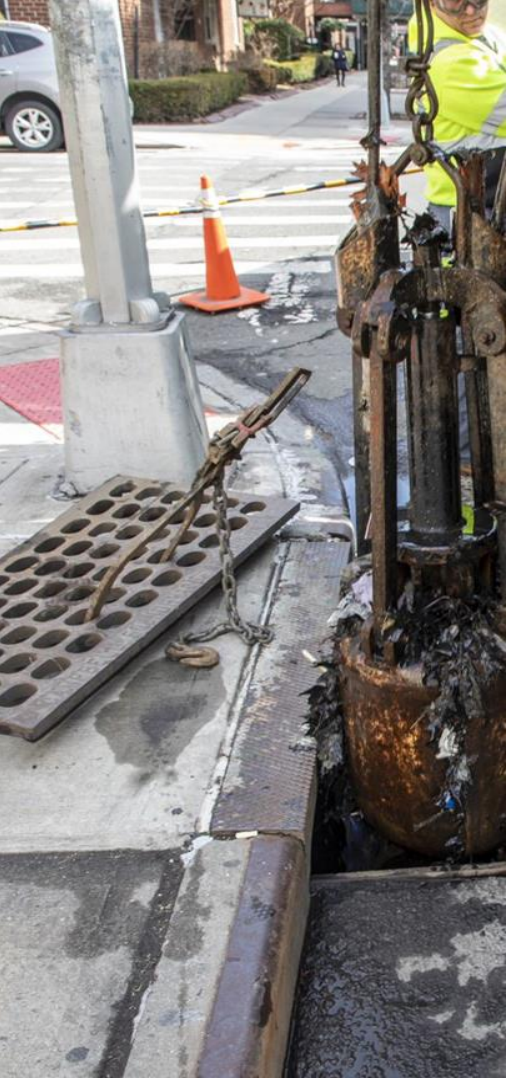
Research question: What AI capabilities are available to identify sounds and images captured in video files (horn honking, loud mufflers, license plates or idling engine sound) and total time sound was recorded and then 'feed' this AI data into existing digital tracking records software.

EXECUTION

Collaborator: We are looking to partner with an academic partner to develop & explore AI capabilities to vet video (with audio) files and to reduce repetitive and mundane tasks, such as inputting information into our existing digital records system.

Planning: Currently our video processing does include various levels of AI, such as reading license plates, but additional machine learning is required to reliably identify sounds.

Vendors: Our video/audio processes are using Google and vendor proprietary resources.



Maximize operations workforce productivity through task routing optimization

Meaghan Burke, Bureau of Water and Sewer Operations, Department of Environmental Protection

CONCEPT

Problem: NYC is known for it's congestion and traffic. Drive time takes up a significant amount of field operation hours that could otherwise be spent completing repair and maintenance work.

Technology: We would like to explore software or technology (AI or sensors) that best automate routes in relation to work location and assignments.

Research Question: What technology could provide an effective way to reduce travel times, and complete field tasks, while saving on fuel and maintenance costs?

EXECUTION

Collaborator: We are looking for an academic collaborator to help analyze our current methodology and data in order to leverage a low-cost impactful future method.

Planning: Currently we have leveraged real-time heavy duty vehicle data related to maintenance tasks. We would like to further this analysis of drive time in relation to our scheduled repair and maintenance work.

Vendors: This is an option if there is a software or supporting technology system that can assist. We are open to in house methods that align with DEP's technology requirements as well.

Rain garden citizen science

Miki Urisaka, Green Infrastructure R&D Section Manager, Department of Environmental Protection

CONCEPT

Problem: NYC has constructed thousands of rain gardens citywide and is exploring scalable options to collect data at as many locations as possible

Technology: Reliable, low-cost, low-maintenance, easy-to-use sensors and/or other data collection methodologies

Research Question: What is the latest available technology and monitoring approach that balances data quality with cost in order to observe long-term trends?

EXECUTION

Collaborator: We are looking for an academic partner to design and implement a low-cost monitoring pilot at a neighborhood scale that leverages state of the art technology and/or citizen science and community engagement.

Planning: We have completed three monitoring seasons using commonly used sensors in the water resources industry. The next step is expanding this monitoring program, building from lessons learned, that can eventually be expanded citywide.

Vendors: This is an option, if necessary, to supplement staff or equipment to implement the pilot.

E-Micromobility charging station needs assessment

Katy Burgio, Senior Program Manager, NYCHA Sustainability

CONCEPT

Problem: NYCHA residents need safe charging and storage solutions for their e-micromobility devices outside of their apartments. NYCHA resident e-bike users are a hard-to-reach population and it is difficult to assess their specific needs and how well our solutions will serve them.

Technology: E-micromobility charging and storage stations, along with associated apps/control systems

Research Question: What are the critical needs of potential users of this infrastructure? How well does NYCHA pilot infrastructure serve the spectrum of user needs?

EXECUTION

Collaborator: NYCHA is looking for a research partner to do a thorough investigation of resident needs within micromobility infrastructure, potentially including willingness to pay, long term storage needs, and other concerns.

Planning: NYCHA has a list of equipment manufacturers and has been starting to meet with resident leadership to get feedback on specific needs for each development where installations will be happening.

Vendors: NYCHA will have to go through a public procurement method to select the ultimate vendor(s). NYCHA hopes to get some information from a preliminary pilot with Con Edison.

Soil quality benefits of leaf mulching

Katy Burgio, Senior Program Manager, NYCHA Sustainability

CONCEPT

Problem: Degraded soil on NYCHA properties decreases potential for water absorption, and increases risk of flooding at NYCHA sites. Meanwhile, NYCHA staff spends significant time raking leaves produced from >1,000 acres of tree canopy.

Technology: Existing NYCHA mower fleet will be retrofitted with mulching attachment to allow for application of leaf mulch.

Research Question: Can mulching grass and leaves into NYCHA soil measurably increase water absorption and improve soil capacity to absorb stormwater runoff?

EXECUTION

Collaborator: We're looking for a University collaborator to help measure the impacts of adding organic matter (such as leaves, grass, compost) on NYCHA soil's water absorption and any associated decrease in site flood risks.

Planning: We are in 2nd year of a small-scale pilot retrofitting NYCHA mowers with mulchers and have early signs of operational success. We need support assessing impact of mulching program on health of NYCHA grounds.

Vendors: Possibly – we may need to procure testing/devices to measure organic matter in soil, moisture retention.

New Building Entrances Pilot assessment

Patrick Conway, Integrated Studio Leader, NYCHA Architecture & Engineering Services

CONCEPT

Problem: Historically NYCHA has installed the highest security doors and entrances for developments. This has not resulted in decreased vandalism and resistance to breakage. The technical design problem is a shift to lighter weight easily replaceable entrances. The broader problem is how best to communicate with residents and stakeholders a shift to create safer spaces through more openness, access, and visibility.

Technology: Video-intercom, Fob-access, off-the-shelf component-based door systems.

Research Question: How should we best evaluate usability of entrances and resident and stakeholder feedback on sense of safety?

EXECUTION

Collaborator: NYCHA is looking for a research partner to assess new entrance pilots. Partner would help with resident and stakeholder surveys and feedback, assessment of safety, maintenance, and repair issues to validate wider implementation for various developments.

Planning: NYCHA is in the process of finalizing construction across six sites with the first entrance being installed twelve months ago and construction set to finish this year on remaining. Evaluation would focus on completed entrances and criteria for those under construction.

Vendors: NYCHA has existing vendors for installation and maintenance but would like to expand the pool for increased response time to maintenance requests.

Automated Inspections of Bike Lane Conditions

Mark Seaman, Senior Economist NYCDOT

CONCEPT

Problem: NYC DOT aims to keep all on-street protected bike lanes in good repair. This requires annual condition ratings of all bike lanes, separate from ratings for vehicle lanes.

Technology: We are not aware of other US cities that have used technology for bike lane inspections. Solutions could include machine recognition of pavement distresses, with camera imagery provided by dedicated inspectors or crowd-sourcing.

Research Question: What technologies can be used to identify and measure several classes of pavement distresses?

EXECUTION

Collaborator: We are open to collaboration with an academic partner.

Planning: We are in the early stages of developing criteria for assessing bike lane condition.

Vendors: We expect that we will eventually be procuring equipment and/or services to conduct these inspections.

Monitoring Truck Compliance

Eugenia Tang, Program Lead Data & Innovation Freight Mobility Unit, NYCDOT

CONCEPT

Problem: Though trucks must adhere to the designated truck route network except when making local deliveries, many trucks make illegal detours on local streets to avoid congestion. While the City aims to foster a culture of compliance with truck rules and regulations, compliance remains a challenge, with limited resources.

Technology: Automate the process of monitoring truck compliance

Research Question: How can we leverage technology to help us monitor and automate enforcement of truck-related compliance, and build a database to monitor street network trends?

EXECUTION

Collaborator: Looking to collaborate to develop, explore feasibility, and pilot automated technology to ensure the safe and efficient operation of trucks in the city, reduce truck intrusion into neighborhoods, and protect unique and aging infrastructure.

Planning: Supported with the aging of Intro 708 of 2023 and DOT's Delivering New York: A Smart Truck Management Plan, DOT is interested in analyzing the levels of compliance to help inform whether rules, enforcement activities, or procedures need to be changed to better meet current demands or industry standard practices.

Vendors: We expect that we will eventually be procuring equipment and/or services to conduct these inspections.

Measuring Curb Use

Matthew Garcia, Deputy Director – Parking Planning & Policy NYCDOT

CONCEPT

Problem: Gathering and summarizing curbside activity data throughout the city is currently a cumbersome process. DOT relies on an in-house system that allows teams to summarize the activity captured in timelapse imagery. While cumbersome, the process is relatively quick to install and nimble in that it doesn't require fixed power or connections. But the post-collection processing is very time-consuming.

Technology: We're hoping to find a solution that combines the nimbleness of our current collection with the automation of more modern image analysis.

Research Question: What technologies can be used to identify and measure curbside activity and users?

EXECUTION

Collaborator: We are hoping to take advantage of academic knowledge about automated image analytics to see how curbside users and activity could be automatically identified in our imagery.

Planning: We are in the early stages of planning this pilot, still trying to understand what's possible.

Vendors: We expect that we will eventually be procuring equipment and/or services to conduct these inspections.

Methods for counting visitors at Parks

Julie Tsitron, Chief Data Officer, NYC Parks

CONCEPT

Problem: NYC Parks needs to know how many people visit our public green spaces in order to make informed decisions about resource allocation and planning.

Technology: We would like to explore technology solutions that can give us accurate numbers of park visitors at several select locations which can serve as "ground truth" for usership numbers and trends more broadly, citywide.

Research question: What are the most effective and accurate methods for counting visitors at parks, playgrounds, beaches, and other areas under our jurisdiction? Open spaces pose a unique challenge, often lacking designated entry/exit points. Visitation patterns also fluctuate highly depending on season, weather, time of day, day of the week, etc.

EXECUTION

Collaborator: We are looking for a University collaborator to help us pilot and compare different options for establishing ground truth counts of visitors to NYC Parks properties during peak visitation season in 2024.

Planning: We have buy-in from the Parks Commissioner as well as the Deputy Mayor for Operations on the importance of this work. We have previously worked with technical partners that specialize in sensor-based counters but those ultimately failed due to vandalized, malfunctioning, or stolen equipment, double counting or missing visitors completely. We have recently identified a potential new partner that leverages machine learning (ML) to anonymously deliver volume counts and pedestrian traffic patterns which could be the solution we need.

Using GPS Data to Support Service and Safety

Matt Berlin, CEO, NYC School Bus Umbrella Services (NYCSBUS)

CONCEPT

Problem: Modern fleets have vehicle location hardware but systems require expensive integrations to perform value-added services such as a) notifications b) measuring on-time performance and c) converting episodic data into trend analysis.

Technology: Use open-source spatial data science protocols coupled with cloud technology to build value-added services at low cost.

Research Question: How can we integrate GPS data with open source spatial data science and low-cost serverless cloud infrastructure to provide a layer of value-added services.

EXECUTION

Collaborator: We are looking for partners to help build out not just our use cases and code but also support scoring of driver behavior over time. Beyond school busing we are looking for other agencies interested in this technology.

Planning: We have developed a solution that integrates with Geotab, a global leader in IoT and connected vehicles to enable these services for ourselves.

Vendors: We have Geotab systems in our buses and the foundations of an AWS analytic system in place. Together for Safer Roads is interested in adding our safety scoring to its work on safe streets.

Developing Low Cost Sensors for School Buses

Matt Berlin, CEO, NYC School Bus Umbrella Services (NYCSBUS)

CONCEPT

Problem: Children on school buses are "precious cargo" about whom parents are rightly concerned. It is challenging for bus companies to monitor conditions, such as temperature, inside buses.

Technology: NYCSBUS would like to develop low cost sensing infrastructure to monitor thermal comfort and other conditions on its vehicles.

Research Question: How can NYCSBUS devlop low cost temperature and other sensors? Is there a market, such as food transportation, transit bus, or others who would also purchase this technology?

EXECUTION

Collaborator: We are looking for partners to help develop low cost sensors, possibly in collaboration with technical students at NYC Public Schools.

Planning: We have piloted commercial sensors using devices designed for food transportation and produced by DIDCOM, our challenge is that they are expensive..

Vendors: We have systems in vehicles, Geotab, to receive input from sensors. We have spoken with non-profit civic tech company Heat Seak about adapting their home based sensor for vehicles.

Autonomous Public Transit

Leo Tsang, Port Authority of New York and New Jersey

CONCEPT

Problem: One major issue in public transit in New York (NY) and New Jersey (NJ) is the problem of the "last mile" connectivity. The last mile refers to the distance between a transportation hub (such as a train station or bus stop) and a passenger's final destination.

Technology:
Autonomous / Self Driving Technology
Vehicle Platooning Technology

EXECUTION

Collaborator: To advance and implement autonomous driving and platooning in public transit, we seek collaboration with universities with strong research programs in transportation, autonomous systems, and law/policy development for research and policy development.

Planning: For five (5) years, we have piloted autonomous driving and platooning, demonstrating safety and efficiency in mixed traffic. Announcing two (2) 2024 shuttle pilots, we aim to showcase viability. Poised for integration pending regulatory solutions, we envision collaboration for enhanced public transit, reinforcing our commitment to autonomous solutions.

Increasing Accessibility

Sara Carrillo, Port Authority of New York and New Jersey

CONCEPT

Problem: Accessibility challenges in public transit systems in New York (NY) and New Jersey (NJ) present significant barriers for individuals with disabilities and special needs. Existing infrastructure, technology, and community engagement strategies fall short in providing an inclusive and seamless transportation experience.

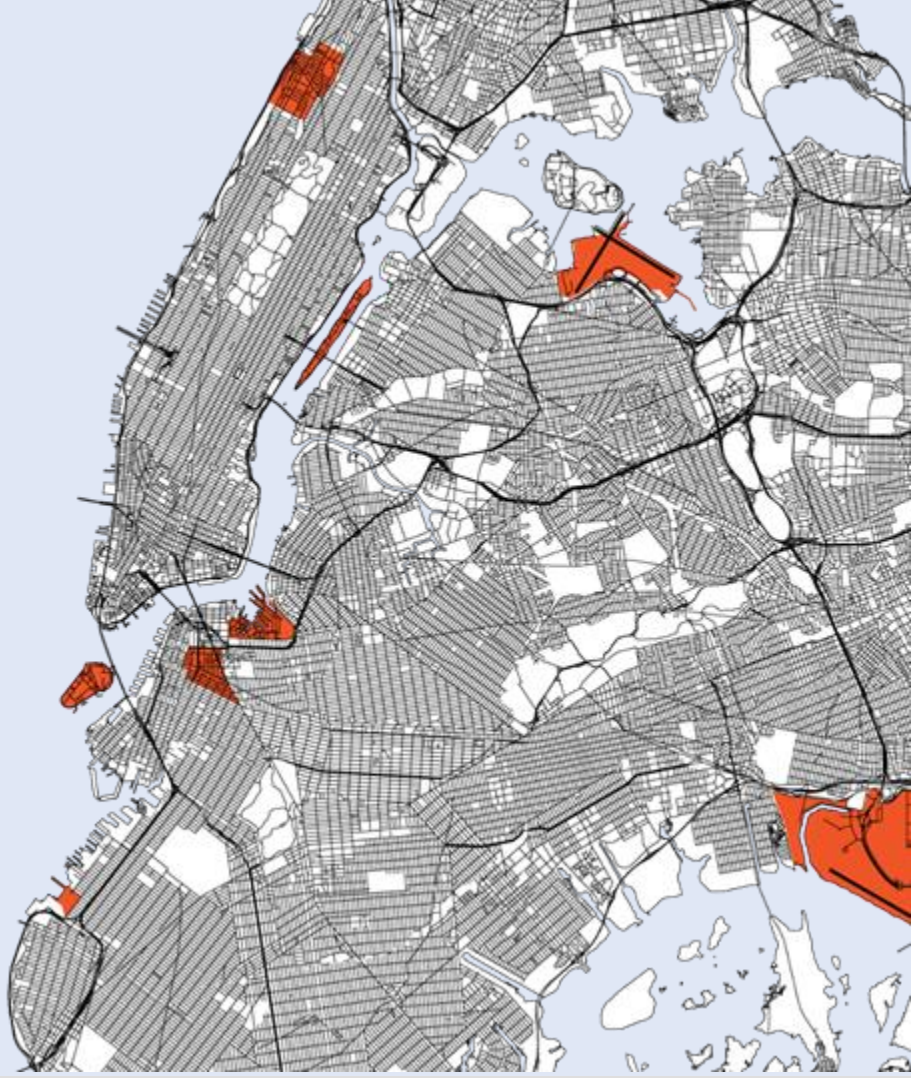
Technology:
WHILL autonomous wheelchairs
Digital projected wayfinding
Signapse

EXECUTION

Collaborator:
We seek university collaboration to integrate accessible technologies, leverage academic research opportunities, and implement technological solutions across multiple agency facilities. We also aim to collaboratively establish and measure KPIs for our pilot programs, advancing accessibility initiatives..

Planning: Initiate focus groups, surveys and public outreach towards increased inclusive design standards and different approaches to accessible technology. Effort has been made to collaborate with internal departments including Aviation, Customer Experience Department.

Academic Pitches

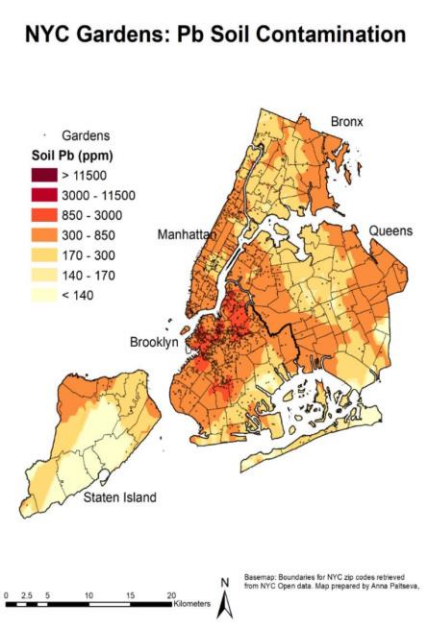


Smart Soil Sensing: Enabling RF-based Wireless Sensing for Soil Lead Contamination

Rajalakshmi Nandakumar, Assistant Professor, Cornell Tech

Zhongqi (Joshua) Cheng, Chair of Environmental Science Department, Brooklyn College

Yixuan Gao, Ph.D. candidate, Cornell Tech



[1] Paltseva, A., & Cheng, Z. 3.1. 11. Application of GIS to characterize garden soil contamination in New York City. *TION*, 565.

CONCEPT

Problem: Residual of the Lead paint and Lead Gasoline contaminate the urban soil in New York City. Existing technologies are either expensive or time consuming.

Technology: We will build a novel cheap multiband RF-based sensor that can wirelessly detect Lead composition in large farms/areas with minimal effort .

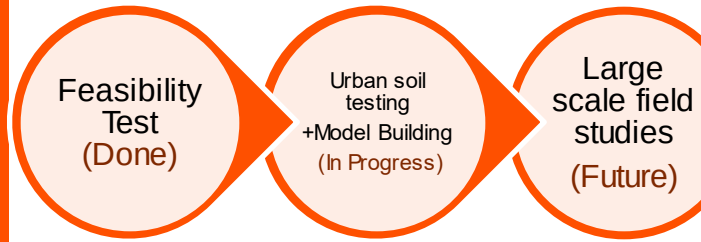
Research Question: We explore the feasibility of

- building cheap sensors that can detect the lead composition in soil.
- social crowdsourcing mechanism to build soil composition maps across the country.
- Using data to enable remediation efforts

EXECUTION

Collaborator: We are looking for support from agencies including EPA and NYCHA to help us build/train and deploy a large AI model for lead estimation with urban soil samples from various communities across NYC.

Planning:



Vendors: Cornell Tech + Brooklyn College

Urban AI Agents: Creating Virtual Intelligence in Real Life

Saining Xie, Assistant Professor of Computer Science, NYU

Environment:
Major cities around the *world!*

AI Agent:
Location. biography, goal, task, mental, physical status...

CONCEPT

Problem:
Urban innovation × ***Generative AI***

Technology: Embodied AI agents with *language* and *perception* capabilities in real world environments (via Google Maps).

Research question:

1. Create AI agents in real life that can 👁️ **See,** 🤔 **Reason,** 🗓️ **Plan, and** 🏃 **Act.**
2. **Exploring**, **analyzing** and **designing** our urban environments in ways previously *unimaginable*.
3. Comparative Global Urban Studies.
4. Examine the potential risks and impacts of AI on future urban technology.
5. ...

EXECUTION

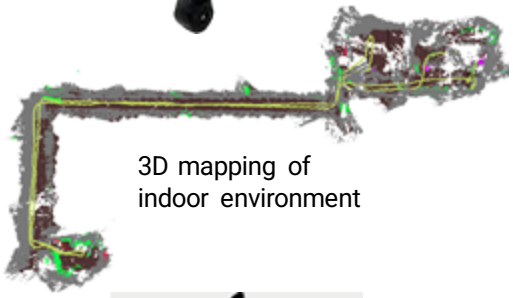
Collaborator: Government agencies to identify real scenarios where our AI agents can help.

Planning: A basic framework is in place, and we've developed several AI agents capable of a range of functions. In 2024, we are looking to pilot AI agents for 1) urban design for sustainability; 2) small business planning; and 3) personalized concierge *("Ask NYC" – a ChatGPT like, multimodal AI assistant).*

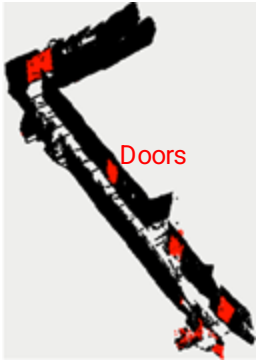
High-Fidelity 3D Mapping of Subway Stations, Buildings, and Other Public Spaces

Prof. Farshad Khorrami, Dr. Prashanth Krishnamurthy, NYU Tandon School of Engg

Prof. John-Ross Rizzo, NYU Grossman School of Medicine



3D mapping of indoor environment



CONCEPT

Problem: Many public spaces such as subway stations and buildings have complex, dynamic, and time-varying geometries making navigation in them challenging for visually impaired persons and robots (e.g., for monitoring and search and rescue).

Technology: Simultaneous Localization and Mapping (SLAM) methods using vision and LIDAR sensors to build detailed 3D maps of the environment in real-time and enable agile navigation to semantically specified locations.

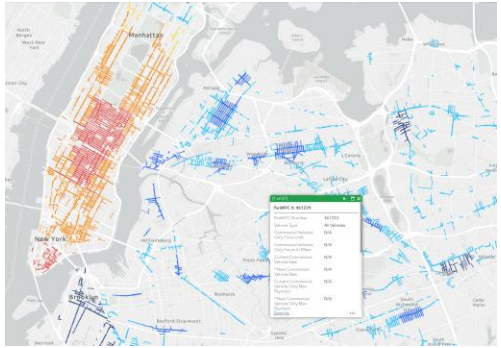
Research Question: What are effective methods to deploy and use SLAM solutions in public spaces taking into account the cluttered and dynamic environments and constraints (size, weight, cost, communication, computation, etc.)?

EXECUTION

Collaborator: We are looking for an Agency collaborator to help us pilot the technology, collect data to refine the technology, perform usability studies, and collect operational feedback.

Planning: We have extensive prior work in the area including SLAM, robotics, and human-machine interfaces. However, we are still trying to identify the right Agency partners to transition the technology. The proposed technology has multiple applications including for visually impaired persons and robots, search and rescue, security, and fire/disaster response.

Vendors: The needed hardware (sensors, etc.) is off-the-shelf and no active third-party vendor involvement is expected.



City-Wide Real-Time Intelligent Search for Parking (CRISP)

Prof. Farshad Khorrami, Dr. Prashanth Krishnamurthy, NYU Tandon School of Engg.

CONCEPT

Problem: Finding parking in NYC is often challenging and time-consuming and there is no easy way to know which streets might have available parking spots.

Technology: Vision-based semantic scene understanding, object (car) tracking, probabilistic modeling and historical analysis, and path planning to enable a mobile app to find nearby available parking spots.

Research Question: Can information feeds (traffic cameras, historical data, parking meter status, etc.) be used to predict parking availability taking into account clutter (e.g., double parking, obstructions) and complications/constraints (e.g., alternate side parking, fire hydrants, driveways)?

EXECUTION

Collaborator: We are looking for an Agency collaborator to help us pilot technology, collect data to refine the technology, perform usability studies, and collect operational feedback.

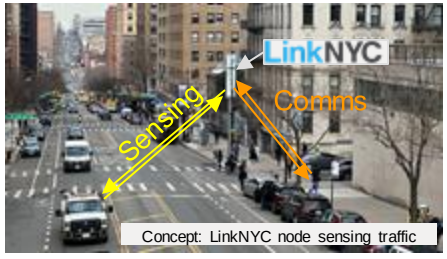
Planning: We have extensive prior work in the area including vision processing, semantic segmentation, scene understanding, object tracking, probabilistic prediction, and path planning. However, we are still trying to identify the right Agency partners to transition the technology.

Vendors: We will collaborate with the Agency partner to access appropriate data feeds. Initial study can also use off-the-shelf sensors to show feasibility. No active third-party vendor involvement is expected.

Leveraging existing 5G wireless infrastructure for smarter, safer NYC intersections

Abhishek Adhikari*, Mahshid Ghasemi*, Mehmet Turkcan◊, Zoran Kostic†, Gil Zussman†
*PhD Student, ◊Postdoctoral Research Scientist, †Professor
Columbia University

Technology



Concept: LinkNYC node sensing traffic


Prototype: Reflected power of comms. channel sensing traffic


Testbed cameras provide ground truth for calibration

Applications


- Autonomous intersections
- Wayfinding for vision-impaired
- Increased crosswalk time for mobility-impaired

CONCEPT

Problem: Intersections can be dangerous for pedestrians and drivers alike. Sensors can help detect accidents in advance and alert drivers/pedestrians accordingly, but they can be expensive to deploy.

Technology: Existing wireless infrastructure used in 5G (e.g., LinkNYC) can serve as high resolution radars in addition to their traditional communication responsibilities without the need of additional capital expenditure.

Research Question: How can 5G wireless infrastructure be used for improving situational awareness at urban intersections?

EXECUTION

Collaborator: We are looking for a government agency to help us pilot and evaluate policy.

Planning: The COSMOS testbed in West Harlem is being used to evaluate the technology. COSMOS consists of 28 GHz mmWave antennas similar to those used in 5G systems. Co-located camera feed from multiple angles serves as ground truth for system calibration.

Vendors: Our technology is enabled through long-term collaborations we have with Nokia Bell Labs and IBM Research, as well in partnership with Silicon Harlem and NYC Office of Technology and Innovation.

Automated monitoring of DoT infrastructure with aggregated dashcam data

Matthew Franchi & Prof. Wendy Ju, Cornell Tech

CONCEPT

Problem: Transportation stakeholders (pedestrians, cyclists, vehicles, and freight) all compete for limited road space, especially in Manhattan.

Technology: We propose the use of aggregated dashcam data to map truck route compliance. We harness a sample of over 20 million dashcam images taken between August and December 2023.

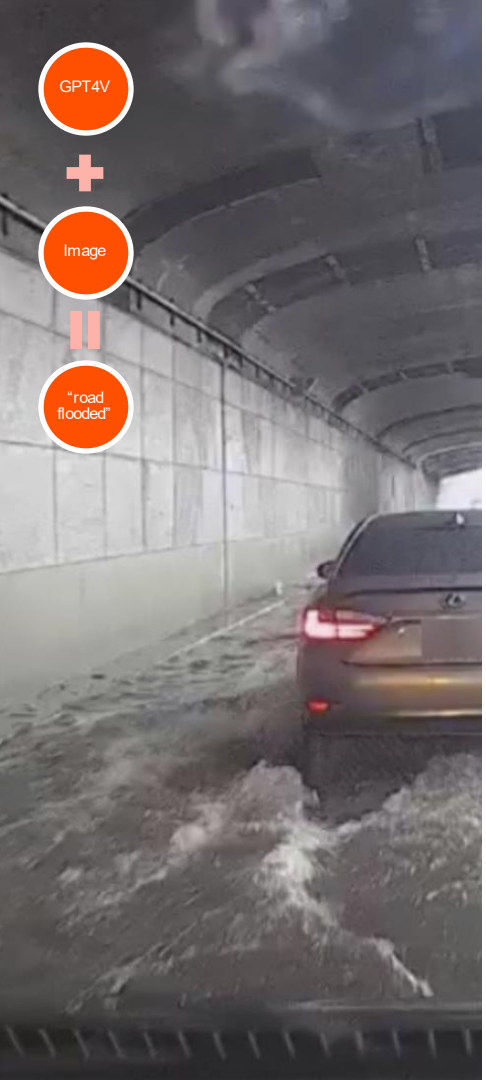
Research Question: What are the most informative ways to utilize aggregated dashcam data in identifying truck route compliance?

EXECUTION

Collaborator: We are looking to collaborate with the Department of Transportation.

Planning: We have developed a codebase that produces road-by-road traffic density for pedestrians, vehicles, trucks, and bicycles, with support for removing parked vehicles from vehicle counts. The codebase is flexible and can easily be ported to other analysis tasks like bike lane incursions & characterizing curb usage.

Vendors: Our data is supplied by Nexar Inc.



Nexar Dashcam Frame

Monitoring hyper-local street flooding through aggregated dashcam data

Matthew Franchi, Prof. Wendy Ju, Prof. Emma Pierson, Cornell Tech

CONCEPT

Problem: New York is increasingly burdened with severe street flooding that impairs vehicular and transit mobility.

Technology: We propose the use of aggregated dashcam data to identify underreported flooding events. We will train an AI model to recognize flooding from dashcam images, using a dataset of nearly a million dashcam images taken on September 29, 2023, when NYC was severely flooded.

Research Question: What are the most informative ways to use dashcam data in identifying hyper-local street flooding, and building a map of past flooding conditions to facilitate infrastructure resilience?

EXECUTION

Collaborator: We are looking to collaborate with the Department of Environmental Protection (DEP).

Planning: We have preliminary research results showing that our image data can be used to identify underreported flooding events, using annotations provided by large vision models CLIP and OpenAI's GPT4V.

Vendors: Our data is supplied by Nexar Inc.

Innovation: The talkable AI-agent built in specific contexts (e.g., central park) serves as a social sensor to collect and analyze human behavior in daily life, transforming public space to be supportive in the future.

Contribution: A novel tool, a responsive urban agent, gathers residents' feedback and provides emotional companion and informative support, which also benefits equality and spatial justice in cities, supporting smart urban governance and promoting interaction in public space.

AI-DRIVEN URBAN AGENT: A Responsive and Narrative City for Everyone

Zhaoxi Zhang, Faculty Fellow; **Tamir Mendel,** Postdoc.; **Vaidehi Raipat,** PhD candidate

Center for Urban Science + Progress, New York University

CONCEPT

Problem: The majority of residents in cities are not involved in urban governance, especially vulnerable and disadvantaged groups. Real-time feedback from residents about urban issues (e.g., infrastructure usage) and their experiences are missing in the decision-making process.

Technology: Apply generative AI and synthetic intelligence technology to envision a city where urban furniture (e.g., benches, street light) combined with AI chatbots can make public spaces more supportive, interactive, and intelligent.

Research Question: How can AI-agent technologies provide opportunities to collect real-time feedbacks within residents and stakeholders, making cities more interactive and responsive to public needs.

EXECUTION

Collaborator: We are looking for city agencies to help us pilot this project in public spaces. For example, collaboration with Town+Gown: NYC, MTA, and other key stakeholders in New York City.

Planning: We have well-designed the pilot project and are currently conducting technology tests: 1) develop an AI agent with urban data inputs, 2) create an interface to facilitate user interaction with the AI agent, 3) conduct indoor test, 4) analyze data to improve the AI agent's capabilities, 5) connect the AI agent with devices and sensors, 6) install it with urban infrastructure in the urban space for real-world applications.

Vendors: Possibly we need to leverage cloud computing services like Google Cloud, Microsoft Azure, and Amazon Web Services.

Methods for auditing Generative AI services

Sarah Dean, Assistant Professor of Computer Science, Cornell University
Thomas Krendl Gilbert, Cornell Tech

CONCEPT

Problem: The limitations and risks of Generative AI remain poorly understood. We are building new interfaces to audit and evaluate Generative AI services.

Technology: We are building a framework (Reward Reports) to track the behavior of AI systems and gather user feedback on system performance in real time.

Research Question: What are the interfaces needed to measure system impacts, clearly relay these impacts to stakeholders, and compile critical user feedback to improve system performance?

EXECUTION

Collaborator: We are looking for city government agencies procuring Generative AI services to help us pilot interfaces for system measurements and user studies.

Planning: We completed our MVP in August 2023 and are planning user studies for early next year. However, we are still trying to identify the right agency partners.

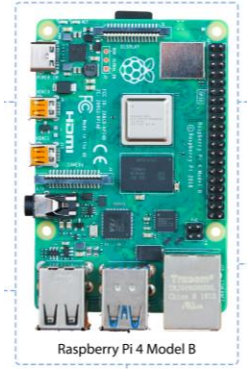
Vendors: Possibly. Our tool is intended to facilitate procurement between technical AI vendors and agency clients.

Bsafe-360: A mobile bicycle data collection platform

C2SMARTER
CONNECTED COMMUNITIES WITH SMART MOBILITY TO EQUITABLY REDUCE CONGESTION

NEW YORK UNIVERSITY

Zilin Bian, Postdoctoral Associate, NYU C2SMARTER Center



- Raspberry Pi 4
- Ultrasonic Distance Sensors
- GPS Sensor
- Real-time Clock
- Accelerometer and Gyroscope

CONCEPT

Problem: Cycling fatalities are still high in metro areas like NYC. While motor vehicle safety has seen significant advancements, bicycles lag behind, especially regarding data collection for safety analysis.

Technology: Use ***mobile sensing technologies***, IoT and AI to create an all-in-one **MOBILITY** and **SAFETY** solution for naturalistic data collection on bicycles.

Research Question: How can mobile sensing technologies and AI be utilized to collect data, develop models, and validate new methods for assessing bicycle safety?

EXECUTION

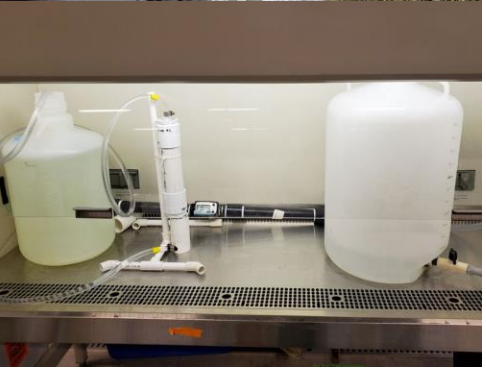
Collaborator: Collaborating with an agency is sought to enhance the device's development and help validate novel safety assessment methodologies that could benefit urban safety planning and policy-making.

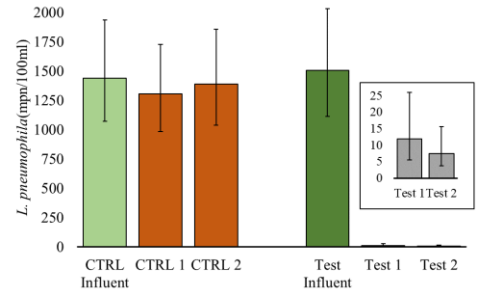
Planning: The project is moving towards a 3rd version of the prototype. We have conducted ***small-scale domestic and international experiments*** with a total of 14 users. Plan to add ***computer vision*** capabilities.

Vendors: We are not currently working with third-party vendors, but are open to collaborations with industry partners, particularly those specializing in sensor technology, and shared bicycle services.

Field Testing of a Novel Antimicrobial Media for Treating Cooling Towers and Storm Waters

Bill Blanford & Greg O'Mullan, Environmental Science, Queens College, CUNY





CONCEPT

Problem: Cost-effective, decentralized, and environmentally friendly technologies are needed to address microbial contamination causing water-way impairment (Stormwater) and legionella outbreaks (Cooling Towers).

Technology: Our patent-pending porous media has demonstrated ability to significantly reduce microbial loads in water at lab-scale.

Research Question: Will our lab validated technology successfully reduce microbial loads at the field-scale and assist agencies and their partners to meet their needs and achieve regulatory compliance?

EXECUTION

Collaborator: Agency (DEP, DOHMH) logistical support to conduct field-scale trials relevant to first adopters addressing environmental and public heath management.

Planning: Following recent NSF Icorps Training and peer-reviewed publication of lab results, we have identified two targets (Stormwater and Cooling Towers), but require assistance to progress to field-scale validation and agency partnership.

Vendors: We have interacted with certified laboratories (IEC, EMSL) and consulted with system integration firms (BAC), but need to establish partners specific to this pilot project.


NYC buildings. Source: Google images.

A computer vision-based approach to detect defects on building façades

Beyza Kiper, PhD Student, New York University

Semiha Ergan, Associate Professor, New York University

CONCEPT

Problem: Façade inspections in NYC are critical for public safety but are hampered by unsafe, and subjective current methods. Automated systems suffer for data imbalance and poor performances, lack of a holistic, temporal monitoring and 3D mapping of defects.

Technology: We want to develop a 3D platform with improved AI detection models that monitor façade defects over time, and dynamic visualization of defects.

Research Question: How can automated inspection be improved to rectify data imbalance, detect and monitor changes, and map defects in 3D?

EXECUTION

Collaborator: We aim to work with NYC inspection companies to test and enhance our 3D defect detection platform, ensuring its effectiveness for improved urban safety.

Planning: We have finalized our initial data collection and and are focused on enhancing our AI detection models through the generation of synthetic images, preparing for the pilot phase of our 3D platform.

Vendors: Potentially - we are considering partnerships with specialized technology providers to enhance our AI detection capabilities and 3D modeling accuracy, ensuring our platform operates at the cutting edge of façade inspection technology.

Submarine Drones for Ferry Inspections

Josef Szende, Regional & Strategic Planning, NYCDOT

CONCEPT

Problem: Create less dangerous and less expensive inspection methods for underwater DOT assets (ferries, bridge bases and street ends).

Technology: We would like to use a submarine drone (potentially paired with point cloud AI) to photograph and track any differences in the surface of the structures.

Research Question: Will the use of submarine drones accomplish as much or more than dive inspections currently do in terms determining critical maintenance needs?

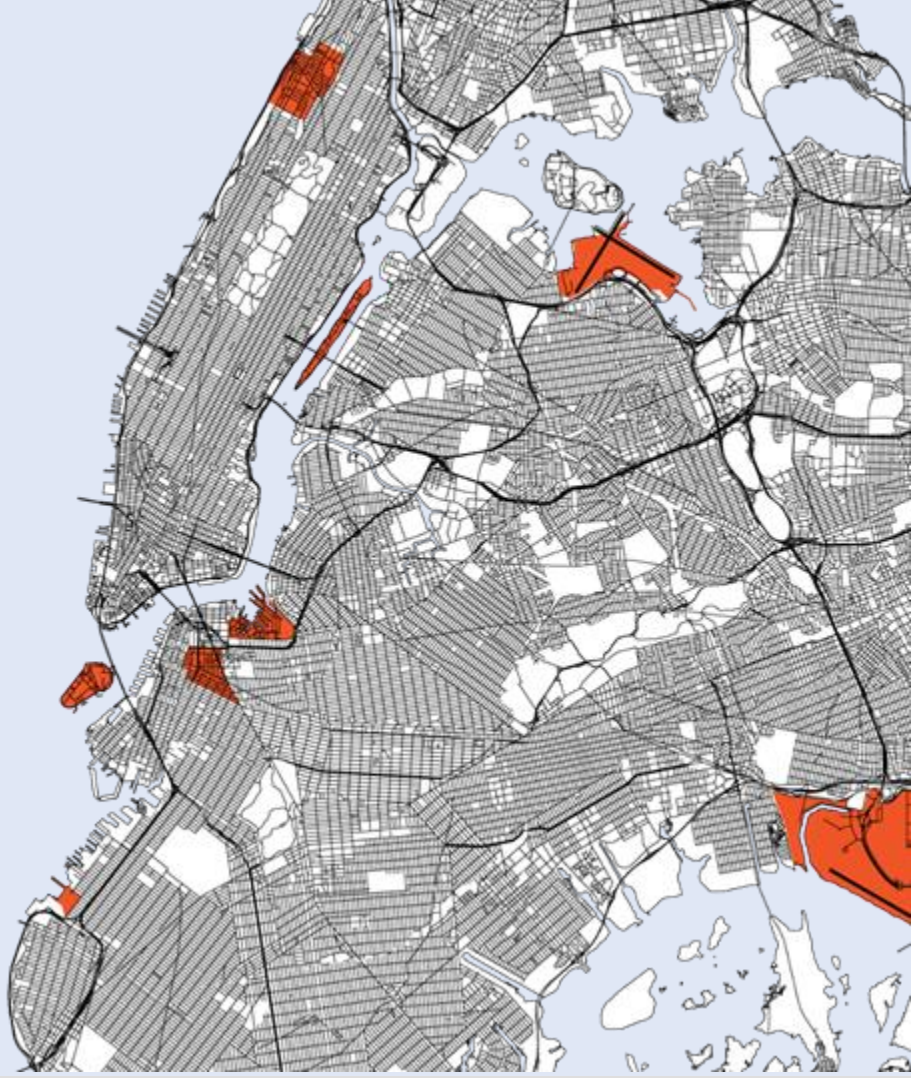
EXECUTION

Collaborator: We hope the university partner can help us clearly establish what the capabilities of submarine drones are as well as what the data processing and analysis methods might be. There is both a physical technology component to this and post-photography analysis.

Planning: This project is supported within DOT but it would need a pilot project to help us learn what would need to happen in a wider roll-out.

Vendors: We expect that we will eventually be procuring equipment and/or services to conduct these inspections.

Next Steps



Attendee Directory – Fill Out By Friday

1. What is your name?
2. Agencies:
    - Please describe what your agency is responsible for in 200 words.
    - What type of pilot projects are you interested in exploring in 2024?
3. Academics:
    - Please describe the focus of your research in 200 words.
    - What type of research projects are you interested in working on in 2024?
4. Get in Touch
    - How to contact you!

What is the timeframe?

Near Term

Dec 15th: Complete the Attendee Directory

Interested in submitting a joint application to the Policy Studio? Feel free to reach out to one of the presenters you heard from today. You can also submit without a partner.

Jan 16th: Application Due

Long Term

Phase 2: Feb-March, 2024 - Matchmaking and contract negotiation

Phase 3: Apr-Aug, 2024 - Pilot performance & validation occurs

Phase 4: Sep-Dec, 2024 - Report is written and finalized

Rolling apps for official government programs: Town & Gown, OTI Smart City Testbed, Pilots at BAT