Annual Report 2013

Public Laboratory

for Open Technology and Science

Letter from Public Lab

Since 2010, the Public Lab community has grown from a 200 person mailing list— the "Grassroots Mappers" who put in endless efforts and energy during the 2010 BP Oil Disaster—to a fully funded nonprofit with over 3,000 contributors. We have found our niche as an organization: we bring together individuals from different backgrounds, build on our collective expertise and experience to address existing gaps in traditional environmental monitoring, namely the lack of tools, methods, and access for communities concerned about the health of their neighbors and local environment. Public Lab is committed to reimagining the research/participant model as a place where people can collectively learn, build, and create together in a way that recognizes expertise within each individual, whether it be in a scientific field, as community organizer, or environmental educator. We are building a community that creates accessible, low cost civically engaged monitoring methods. We look forward to focusing our efforts around community science and data advocacy in the coming years.

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When the seven co-founders of Public Lab came together after the BP oil disaster and thought through creating an organization, we focused on the gaps in everyday social and environmental crises around us, finding that there weren't points of access for response by the communities directly impacted. As the work of Public Lab increased and more people came to view Public Lab as an abundant community of practitioners and doers, we continued to see that environmental issues surround us and impact us when least expected. During 2013, we worked towards building up community response capabilities and proactive networks that would be responsive to local issues and through the wider Public Lab network, to global issues.

Our full scale launch of the Public Lab spectrometry project in late 2012 and early 2013 was informed by our experiences during the initial days of the BP oil disaster; walking beaches and coming across large tar balls, asking questions about how we could identify oil on the spot or how we could reframe the necessity of expensive lab equipment to do our own monitoring.

Our work to create an oil spill response kit has been informed by news of oil train derailments and spills in other regions like the Great Lakes. These types of everyday environmental health hazards occur globally and have pushed Public Lab, through 2013 and moving forward in 2014, to create a focused network around creating tools and communities of expertise (whether local or scientific), who are prepared to act as a supportive network of global community science practitioners.

Imagine if a community dealing with their everyday, slow moving local river pollution could turn towards the resources that the Public Lab Open Water initiative can provide: a community with a breadth of experience, interest in collaboratively working on finding solutions and tools for measuring the health of water, resources for immediate sampling, and the ability to interface with an issue affecting their community. This is what we're working towards.

Our focus in 2014 has been to introduce and reframe our work into the thematic focuses of Open Air, Water, and Land. We've had the opportunity to grow our outreach staff and our Kits initiative giving us the capacity to focus on new projects. We're in a year of expansion, looking towards broadening and growing the story of Public Lab through the projects that uniquely tie innovative media to community organizing, public health and environmentalism. By concretely focusing on supporting people working on the everyday environmental impacts in their own communities, we're building a framework of data in action as we look towards the next years of our work.

—The Public Lab nonprofit team

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Layout and Editing by Molly Danielsson, August 2014.


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Public Lab 2013 Highlights

Over 236,946 people from 210 countries visited PublicLab.org during 2013.

Public Lab became a registered 501(c)3 not-for-profit organization, on October 23, 2013, retroactive to January 2012.

The Infragram, a near-infrared photography project, launched via Kickstarter in July 2013 **netting $71,373 from 1,556 backers** with a $10,000 match from the John S. and James L. Knight Foundation.

Public Lab was selected as an **Honorable Mention in the 2013 Buckminster Fuller Challenge**, the prestigious annual design science competition named "Socially-Responsible Design's Highest Award" by Metropolis Magazine.

Public Lab launched its kits program in January 2013; by December 2013 **over 3,000 DIY spectrometers were distributed.**

Public Lab hosted the **third annual Barnraising** in October 2013. Although a tropical storm forced the gathering to move from Cocodrie to New Orleans, over fifty people from across the globe joined the retreat.

United Bulk Coal Terminal Monitoring

Ironton, Louisiana

With Public Lab training, tools, and support, Public Lab organizer Scott Eustis of Gulf Restoration Network (GRN) and Devin Martin of Sierra Club successfully captured low-altitude photos of ongoing coal export dumping in the Mississippi River. The images they secured of the coal pile over time changed GRN's understanding of the extent of Oiltanking/United Bulk's alleged environmental crimes and led to funding for further documentation and water quality analysis of this facility, culminating in a notice of intent to sue under the Clean Water Act. Although GRN had been passively monitoring this site via aircraft, the kite photo, because of its low-altitude and oblique angle, led to a new understanding that moved Louisiana Department of Environmental Quality to do a site visit. GRN, Sierra Club, Louisiana Environmental Action, Tulane Law, and Public Citizen, have prepared to sue to improve the facility and levy fines against the company for their damages to Louisiana's waters: they are currently in negotiations with the company. The image itself is one of a series in legal proceedings, but has more value than others taken by planes because of its level of detail. The photo is used as an organizing tool to demonstrate effective imagery for officially documenting Oiltanking's water pollution crimes to volunteer pilots and GRN members who reside in the area.

Refining Methodologies for Oil Identification

Boston, Massachusetts

Testing at a Boston-area meet up helped to refine "do-it-yourself" methodologies for identifying different contaminant oils— ranging from motor oil to tar balls washed ashore after a crude oil spill. Attendees to the event, hosted by the neighborhood education group Parts & Crafts, included local residents, as well as members of the Mystic River Watershed Association and Pioneer Valley Open Science. The prototype testing involved a new technique for distinguishing oil samples via florescence using an inexpensive blue laser pointer. The tests were promising, and the technique appears robust: showing similar fluorescence curves despite slight variations in sample preparation. These were included in our alpha-stage prototype oil contamination test kit and continue to be developed. These methods show great promise, and will likely be included in our prototype oil contamination test kit. Follow progress on the oil testing kit here: publiclab.org/tag/oil-testing-kit.

Balloon Mapping of River Restoration at Mardi Gras Pass

Mississippi Delta

Gulf Restoration Network (GRN), a wetlands watchdog group and a valuable partner of Public Lab, has repeatedly used aerial mapping tools to advocate for wetlands restoration projects and to keep community and partner organizations abreast of progress (or lack thereof). One specific instance is the use of kite photography to educate and agitate for the closure of a new branch of the Mississippi River, "Mardi Gras Pass." If left alone, this new distributary arm would feed protective marshes and swamps with nourishing sediment and water.

Documenting Restoration Projects in Yellow Bar

Jamaica Bay, New York City

Public Lab organizers Gena Wirth and Eymund Diegel, along with Rob Holmes of the Dredge Research Collaborative, conducted aerial imaging documentation on various restoration islands in Jamaica Bay. Aerial maps document progress on the Army Corps of Engineers initiative to restore eroding salt marsh habitat with recycled dredge material, show shoreline and vegetation change over time, and document citizen participation in these efforts.

Jamaica Bay's islands are in constant transformation. For decades, Yellow Bar hassock (pictured here) has been shrinking and losing ground due to intensifying urban impacts in the Jamaica Bay watershed. This pattern recently reversed course under the direction of the Army Corps of Engineers, who use the island as a site to dispose of dredge material and as a test case for expanding ecosystems in decline. Like much of Jamaica Bay, the resulting landscape is neither fully industrial nor fully natural, though it retains aesthetic and performative qualities of both. The flat expanse of newly constructed ground is composed of clean sand dredged from the Ambrose Channel, the main shipping channel leading to the port of New York/New Jersey. Aerial maps reveal the regularized distribution of the complex marsh matrix of sediment, *Spartina* (cordgrass), and ribbed mussels, which grow together in a functional ecosystem and stabilize the marshland. Beyond the dotted fringe of cordgrass clumps, the photos document the expansive island interior, touched by the Army Corps of Engineers in a more economical fashion with a grid of fences marking *Spartina* plug planting zones. Mapping events have been led in partnership with the American Littoral Society and Jamaica Bay Ecowatchers.

Use of Balloon Mapping to Temporarily Stall Eviction

Kampala, Uganda

Using aerial mapping, the Craft Market near Kampala worked with María Lamadrid to combine a high resolution map of the area with community narratives. The goal was to gain time so the community could organize next steps and create a dialogue around urban planning and displacement. The Craft Market was able to legally stall their eviction for a month by using the map to acquire a court injunction from local authorities. They also interfaced with the Ministry of Tourism via the map they created, demonstrating their value to the tourism industry. The Ministry of Tourism sent a team to evaluate the Market and tried to advocate to the Ministry of Land on behalf of the Market. In the end, the Ministry of Land went through with evicting the community. The Craft Market decided to do a second map to record the progress of clearing and to document the lack of support during the eviction, demonstrating how the eviction displaced the previously flourishing market to a side street. Using this map, the Craft Market is still in the process of advocating their case. View the map here: http://mapknitter.org/map/view/juakali.

Gowanus Low Altitude Mapping (GLAM)

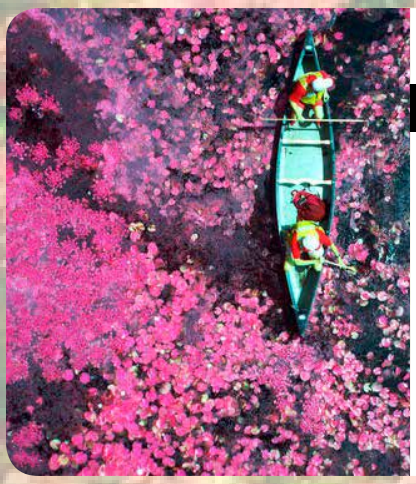
Gowanus Canal, Brooklyn, New York

Public Labbers are working with the Gowanus Canal Conservancy and Proteus Gowanus to conduct environmental investigations in the Gowanus Canal Superfund Site and broader watershed using aerial imagery. There are three distinct goals within GLAM: 1) researching biodiversity to better manage the urban ecosystem; 2) conducting eco-detective work to improve the government's Superfund clean-up plan; and 3) advocating for watershed health by identifying upland sites that can be used for storm water absorption to reduce downhill sewage overflow events into the canal. GLAM has succeeded in improving the Superfund clean-up plan: diligent investigation led to the discovery of an unknown freshwater inflow in the Gowanus First Street Basin, and their presentation to the EPA's Community Advisory Group was so effective that Superfund restoration expanded an additional city block. Through vigilant aerial surveying, despite ice and blazing sun, the subsequent analysis identified four active pipes and inflows that the EPA's survey missed which is leading to other improvements in the clean-up plan. Other independent research projects of the Gowanus have uncovered what appear to be historical Revolutionary War burial grounds which have since led to partnerships with the Brooklyn Preservation Council and the local Veterans Affairs chapter, as well as support from the Governor of Maryland and coverage in the NY Times.

Monitoring an Open Landfill

Saugus, Massachusetts

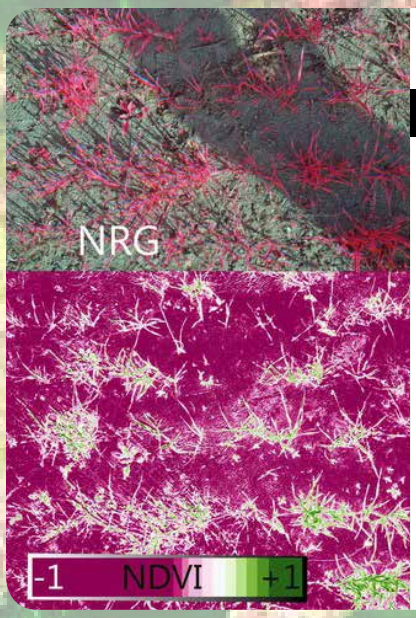
Public Lab worked on a multi-year project with Basurama.org to monitor the growth and treatment of ash at the open landfill bordering the Saugus waste incinerator, adjacent to both wetland and residential areas, with annual DIY multispectral kite photography. The project engaged residents of the Boston area in investigating local waste cycles as well as the toxicity and exposure issues related to the waste incineration process and the storage of ash. Public Lab organizer Pat Coyle has recently worked on a 3D (Surface From Motion) reconstruction of the site using images collected from the kite photographers. Project lead Pablo Rey Mazón hopes to work towards connecting the 3D map with volume estimates that other Public Labbers are researching to compare with official data. Rey Mazón plans to replicate the project with a similar trash incinerator in Bilbao, Spain.



Monitoring Invasive Aquatic Plant Removal

Amherst, Massachusetts

UMass Amherst, the US Fish & Wildlife Service, and Pioneer Valley Open Science monitored invasive aquatic plant removal using DIY multispectral aerial photography and balloon mapping kits. Aerial photographs of the lake effectively reveal the invasive water chestnut, as it is distinguishable by both color and texture at low altitudes. The goal is to use normal and color infrared images to locate patches of water chestnut as part of the much needed yearly monitoring to prevent the plant from spreading. Through continued technical development, Pioneer Valley Open Science is interested in automating classification of NDVI (Normalized Difference Vegetation Index) images as a "one-click" solution for citizens monitoring invasive species in their waterways.



Documenting & Quantifying Soil Treatments

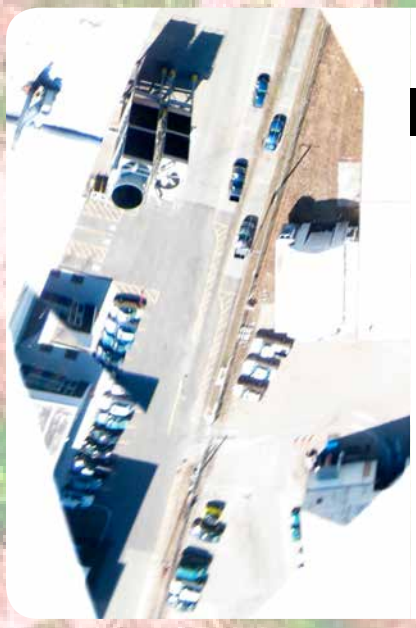
iFarm in Pioneer Valley, New Hampshire

Public Lab is part of a multi-year project to document and quantify cover crop soil treatment and silvopasture trials using infrared photography and aerial mapping. This is part of a broader effort to develop data-driven analysis tools to support small-scale organic farmers, and is being pursued in partnership with Green Start, Farm Hack, Pioneer Valley Open Science, and the sustainable agriculture program at the University of New Hampshire. Through this work, collaborating farmers have gained a better understanding of the health of their crops as well as a greater capacity for regularly comparing crop health at low cost. In addition to providing a compelling case study and proof of concept for the tools that are being developed through this work, the research has produced new insights and initiated new projects— such as more affordable and robust single-camera multispectral imaging that forms the basis of the Public Lab Infragram program.

Pilgrim Nuclear Power Plant Mapping

Plymouth, Massachusetts

Using images collected via kite mapping, organizers are challenging the lack of a permit for new construction of a waste storage facility at the Pilgrim Nuclear Power Station. To date, two aerial imaging trips led by Cape Cod Bay Watch have given local residents the ability to keep themselves informed about the progress of the construction, in addition to generating images and a compelling story which has resulted in press coverage (WBUR Boston-NPR) of their monitoring and advocacy efforts.



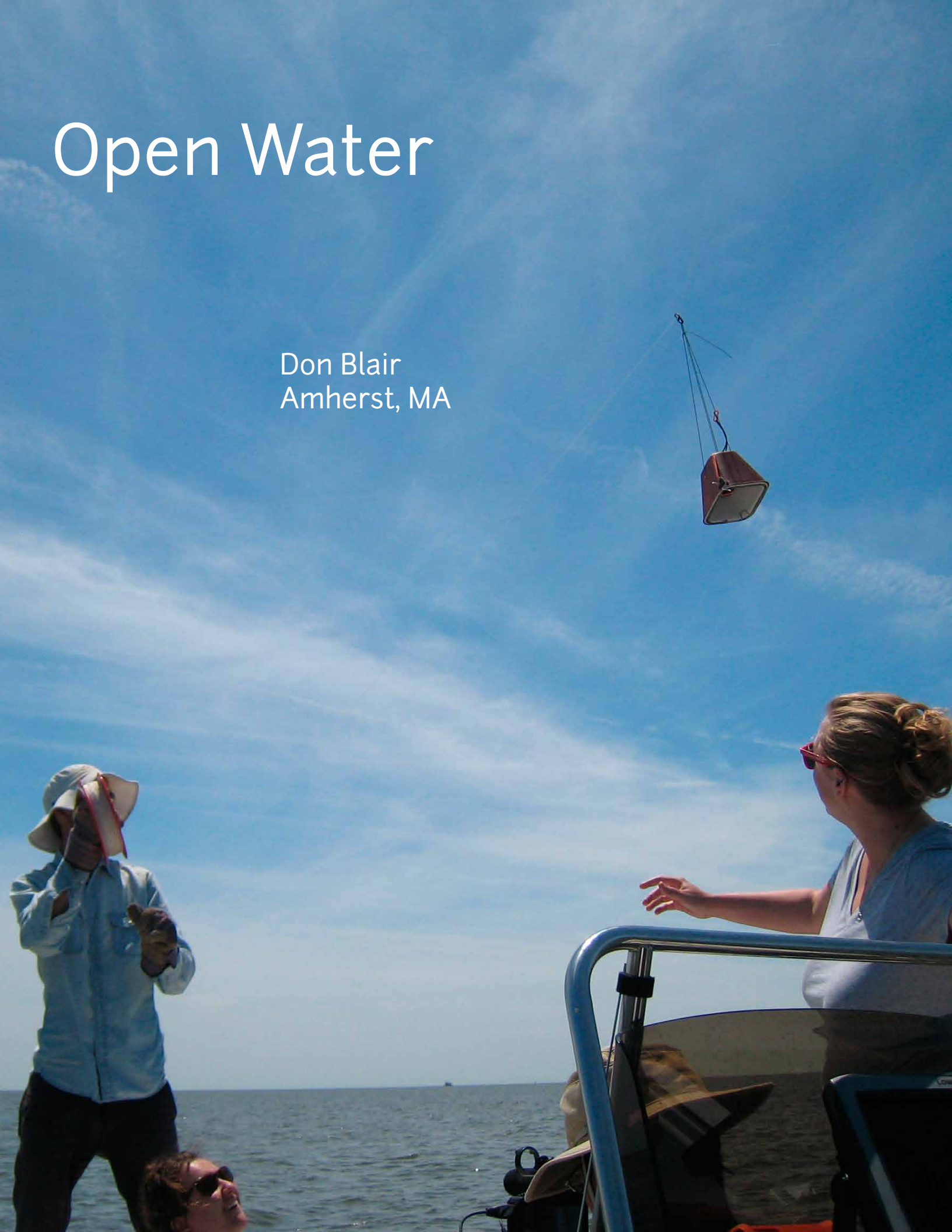
Documenting Code Violations by Metal Recycling Center

East Providence, Rhode Island

Local residents and Northeastern University faculty used kite mapping kits to monitor a metal recycling center for code violations and contamination. This is a long, complex investigation involving legal battles. A neighborhood in East Providence, RI adjacent to a large construction waste-grinding business has noted toxic dust from the plant filtering into homes and yards. Many in the neighborhood suffer from respiratory and other health problems thought to be associated with the dust. Neighborhood activists managed (with Toxic Action Center's help) to have the waste grinding stopped. However, the same business owner re-opened the plant as a scrap metal processing operation, but with a permit that allows for limited operations for under fifteen tons of wood products. After the waste grinding stopped, balloon mapping was organized in March 2013 to document whether there was unpermitted processing of materials other than wood. Advocates have added detailed annotations to their aerial imagery to communicate the issues on the ground and attempt to convince authorities to take action to determine whether the plant is in fact processing materials beyond wood.

Open Water

Don Blair
Amherst, MA



This last year of Public Lab work has been incredible for me. In particular, it's been really great to see the reaction people have to what Public Lab is doing, and what it represents. I've now traveled to Rwanda and Colombia on behalf of Public Lab, and whenever I tell people about the way that Public Lab brings an 'open source, grassroots ethos' to environmental monitoring and environmental justice, the folks I'm talking to always seem to get the idea immediately and become really enthusiastic. So, for me, it's been a year of being a bit of a Public Lab evangelist, and revelling in the fact that Public Lab has come up with this great approach, and one that generates such positive responses.

In 2013, I've found myself shifting away from trying to incorporate Public Lab into academic science and instead, I've come to view Public Lab as the place where 'truly good science gets done.' After years spent in academic research, I've come to feel that the Public Lab community is now better able to model how scientific research should be conducted than the typical academic community. Many of the criticisms and innovations that I'd begun to formulate within academia already seem to be addressed by the way the Public Lab community conducts, and shares, its research. Maybe even more importantly: I think the values and the interests one finds now in the Public Lab community are more closely and authentically aligned with the most important scientific and technological questions we face as a society today than are those of most of the academics I've known. And I don't blame individual academics for this— the typical academic system forces them into an odd set of incentives. Until recently, I thought my role was going to be to rail against scientific institutions that seem to be locked into relatively unproductive or out-of-touch approaches to science; it's been wonderful for me to instead be able to participate in a community that is conceived and structured in such a way that it tends to 'do science right.' (I'll still likely dabble in critique, of course.)

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All that said, I feel that the Public Lab work I'm currently focusing on—the Open Water Project — is going to require finding useful ways of reconciling the academic and non-academic worlds. In this project, we're finding that there's a lot of useful expertise among hydrologists that we want to be able to leverage when making DIY water quality devices and interpreting the data that comes out of them; the challenge is going to be finding ways of bridging the various communities that need to work together to address water issues.

Local residents worried about their tap water have a very different set of concerns than typical hydrogeologists do; both groups have vital contributions to make to the problems we face. What does a meaningful grassroots monitoring effort look like? When data analysis is very complex and a lot of background knowledge is required for interpretation, how do we best support a truly participatory process that involves everyone? How do we transition from a DIY (do it yourself) approach, to a DIT (do it together) approach that brings everyone to the table without reinforcing unhelpful hierarchies in authority? These are the big question for me going into 2014.

How do we transition from a DIY (do it yourself) approach, to a DIT (do it together) approach that brings everyone to the table without reinforcing unhelpful hierarchies in authority?

Plans to address these questions have already started to come into place. I'm particularly excited about the conversations that Public Lab is now having with the EPA about water quality monitoring. In those discussions, we've suggested the idea of working together to develop 'bridging data protocols' that allow data collected by citizens to be considered 'valid' for various uses by the EPA—and the EPA seems to have been thinking along similar lines. In the future, I'd love to see Public Lab form initiatives like this with agencies and institutions in many areas, and in many places; to see such conversations happening already, and proceeding at such a rapid pace, is one of many reasons I'm convinced that 2014 is going to be a really inspiring and productive year for grassroots science.

Public Lab organizers at iFarm in Lee, New Hampshire.

Transformative Experiences in the DIY realm

Cindy Regalado
London

This last year has been a wonderful journey filled with enriching experiences, realizations and above all, inspiring people. I am researching 'Publicly Initiated Scientific Research' for my PhD research at University College London within the Extreme Citizen Science research group with the continued support of Professor Muki Haklay. The most insightful moments of 2013 were the five workshops in London and Amsterdam with Shannon, Mathew, and Jeff from Public Lab. In London, what stood out the most for me in the kite-mapping, kite-making and DIY spectrometry workshops was that many of those who took part in the workshops expressed 'experiencing the power of DIY' very strongly. Many of them shared a realization of (self)trust in their abilities to question and to do; that if they ever needed to, they could take issues into their own hands.

The one-week Eclectis programme in Amsterdam with the wonderful junior school kids at Hyperion Lyceum made me reflect further on inciting (self) trust—especially a belief in that what they do actually matters, that the fruits of their efforts will actually materialize into positive change. The grand finale of the Eclectis programme consolidated this: after four days of kite-mapping, spectral and near-infrared explorations, what was to become of all that experience? The kids worked together in a matter of hours to devise extremely creative and interactive displays to share their knowledge and experience of civic science and DIY with the 500 Amsterdam dwellers visiting their school.

I also had the opportunity to meet Eymund Diegel at the Gowanus Canal in Brooklyn, New York and get the scoop on both the history of the canal's environmental condition and the efforts to address the situation restoration with the Gowanus Canal Conservancy. The story of the Gowanus Low Altitude Mapping project, Eymund's efforts, and the stories of the community surrounding the canal are so rich we could write a book (and we should!) I remember Eymund's humble and insightful words, 'These efforts provide the granularity and nuance that renders them inclusive of local issues, knowledges, politics, and sustainable solutions.'

The DIY aerial mapping workshops in Perugia, Italy- part of the International Journalism Festival- narrowed in on what Hagit Keysar called us reflect on "where do the maps go?" How will stories be told and by whom? We know for sure that ideas of civic science have infiltrated investigative journalism and that two new kite mappers are knitting stories in Naples and in Brussels.

Image Credit: Jeff Warren. Near Infrared Boxheads made by students from Hyperion Lyceum using their newly hacked Near Infrared cameras as a way to share their learning/experiences with others.

In the past year we have run two series of playshops with a new and unconventional approach: 'Exploring borders through art' and 'Explorer of the world'. The approach here is to be 'open to outcome' (much like in Amsterdam with the Hyperion Lyceum kids). The 'open to outcome' approach has enabled us to engage with the complexity and context of issues by using a mix of tools from improvisational theatre and video animation to civic science and (auto) ethnography. In the playshops I distinguish training from inciting/stimulating and between participant and researcher/ explorer/tryer, where the researcher/ explorer engages in a process of self inquiry to discover for themselves how they would pursue their own investigative exploration.

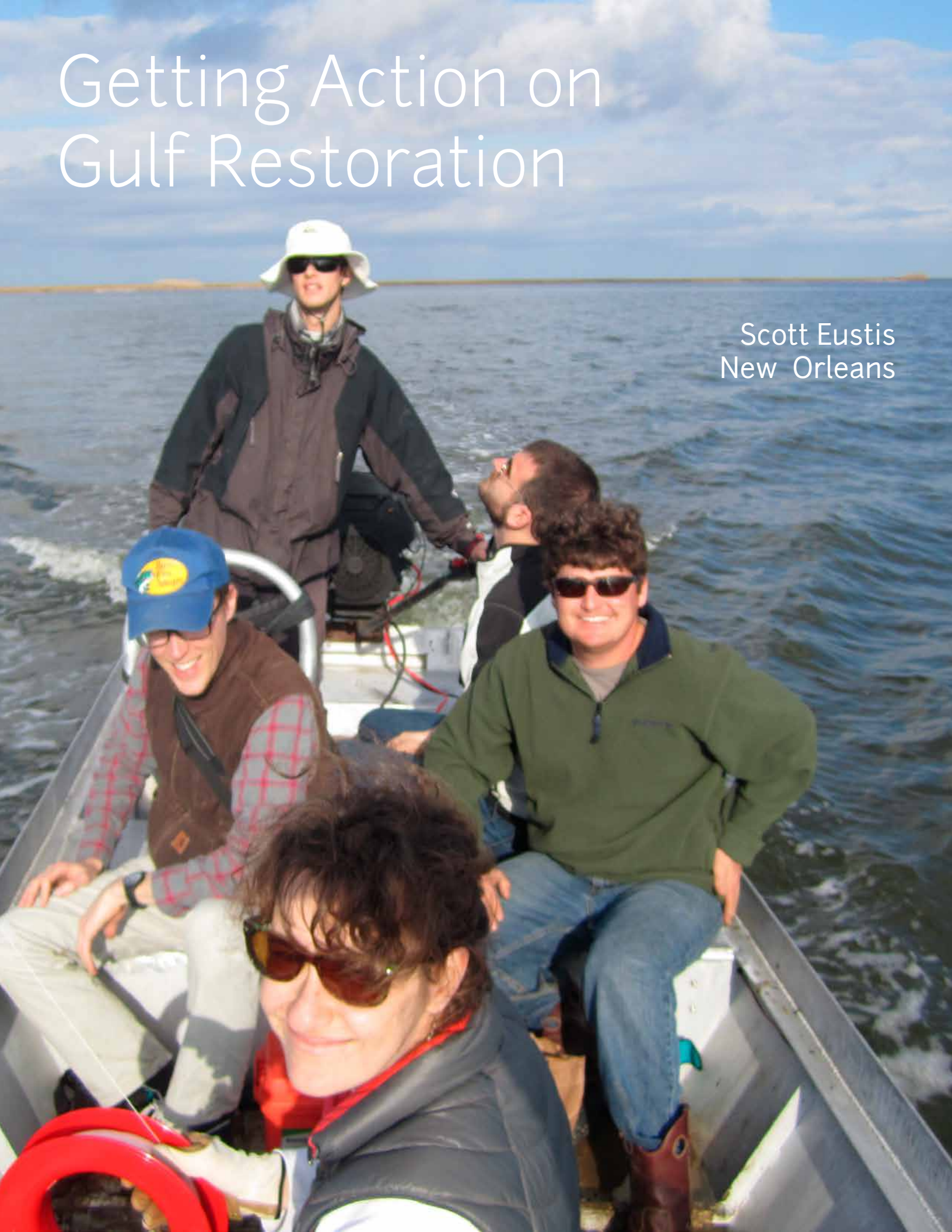
Through storytelling and improvisational theatre we incite inquiry or "questioning the state of things" and we enter a world whose environment is conducive to owning our own knowledge and understanding and where the fruits of our efforts are materialized. This experience is often contagious through excitement, and many researchers share it with and incite it in others. As Participant Action Research (PAR) practitioner Rahman reminds us, "those who are taught, rather than stimulated to search for themselves, would, in turn, be prone to 'teaching' others in their charge rather than stimulate self-inquiry in others" (2008).

The end result has been powerful playacting of how we relate to the world. The key in many of the playshops was to practice a lack of expectation, appreciating things for what they are, and getting back to a child-like state of playfulness and wonderment. Over the past two years I have learned that when engaging with DIY technologies and engaging in DIY research there is a very powerful element at work—there is genuine joy when learning that you are able to do, sense, or create something you did not think you could, especially when you have made the invisible visible with your own hands.

Rahman, A. (2008). Some trends in the praxis of participatory action research. In The SAGE handbook of action research: participative inquiry and practice (p 49–62). Sage Publications.

Image Credit: Waag Society. Students from Hyperion Lyceum catching the kite camera rig.

Getting Action on Gulf Restoration



Scott Eustis
New Orleans

This was an exciting year to be working with Public Lab on the Gulf Coast. Our corner of the United States is always ripe with possibilities for observing pollution. Last June, I had a breakthrough when Gulf Restoration Network was able to convince the Louisiana Department of Environmental Quality, based on kite photography, that a petroleum coke terminal in lower Plaquemines needed to be addressed. Petroleum coke is a by-product of oil refining that is burned for fuel in countries where air standards are not as high as in the United States. The terminal has been dumping into the Mississippi River for decades, and Gulf Restoration Network (GRN) had been reporting on the waste for a year, but the detail of the kite photo is what it took to convince our enforcement agency to act.

Restoration of the Mississippi River into its delta is considered a core element of the Louisiana coastal Master Plan. We need companies to stop dumping refinery by-products into the river: otherwise, our wetland restoration projects will be littered with the stuff.

As United Bulk Terminal continues to deny that their petroleum coke is going into the river, photographic evidence displayed in public and in the media is essential for keeping them honest. Public Lab spectrometry work has the potential to do just that.

After some time, I developed a process for diluting tar balls into something I call "Grand Isle coffee" that was translucent enough to run a green laser test. It was so gratifying when the green light turned orange, signifying the presence of tar and naphthalenes. I'm ready for the next phase of the test, to analyze the wavelengths of light with the Public Lab Spectrometer. Once we know exactly what kinds of wavelengths signify oil, I'd like to distribute this test, with the oil testing kit, to GRN members across the coast. Four years after the rig explosion and Deepwater gusher, along with our regular storms, we have chemical weather—bits of tar mats that get pulled off and rolled up on Gulf Coast beaches.

Photographic evidence displayed in public and in the media is essential for keeping them honest. Public Lab spectrometry work has the potential to keep BP honest.

I hope to continue in the spirit of Rip Kirby's work for Surfrider. Kirby used a more expensive light kit to detect the presence of oil and Corexit (an oil dispersant) that otherwise goes unseen. Four years out, we need to shine a light on this less visible pollution, and create a low cost screening method for determining the characteristics of the tar.

Although the view is not always uplifting, it's been a downright pleasure to organize Public Lab's aerial survey work in Barataria Bay. We've been able to turn a small grant into a venue for a score of advocates and local residents to do a bit of real time co-education about the rapid changes in our landscape. The kite and balloon photographs we've taken of the disintegrating rim of Barataria Bay is an important part of documenting BP's aggravation of the legacy of industrial damages to our great North American delta. With these images, we can broaden and deepen the story of our home, the great estuary that keeps us sheltered from coastal storms and the great engine of life that keeps on producing so many birds, fish, and mammals that are our regular company in the sportsman's paradise.

Tar from the surf on Elmer's Isle, LA.

Image Credits Scott Eustis. Barataria Bay and Bayou.

Open Community

I can certainly say without a doubt that the first collaboration I did with Public Lab was a life changing experience. I've been taking part in Public Lab's community by working with the aerial mapping tools since 2011. I began by using the balloon and kite mapping toolkit as part of an educational project I initiated in Mamuta Art and Media Center in Jerusalem to visualize and map spatial experiences of Israeli and Palestinian youth living in the city. I very soon realized that there's much more to discover, that Public Lab is not simply a collection of cool tools and some really brilliant people, but also an exciting new form of community.

Currently I am a PhD candidate at Ben Gurion University's Politics and Government Department in Israel. My research interests grew out of my experiences with Public Lab's aerial mapping tools and methods. I develop and investigate the use of DIY aerial mapping tools in Jerusalem as an instructive case study for probing the political and spatial implications of participatory mapping technologies in contested urban environments.

This past year, I've been spending most of my time establishing collaborations with communities and institutions, giving workshops and lectures on community aerial photography and civic science within and outside the academy. In 2013 I conducted six aerial mapping workshops in Jerusalem; three of them have led to the development of longer term projects within academy-community partnerships, which are now case studies in my research. These collaborations include two separate projects with Arab/Palestinian residents (who are not full and equal citizens in Israel) and Jewish/Israeli residents in Jerusalem who find DIY mapping to be inspirational and useful in their struggles, concerns and advocacy work. People in Jerusalem try DIY mapmaking tools for a range of reasons— issues of inequality and ethnocentric discrimination in urban planning processes; increasing community awareness; participation in planning procedures; to visualizing current and historical spatial narratives in the city.

During the next year I will be writing my dissertation based on my experiences mapping with residents in Jerusalem. I also intend to continue investigating methods for visualizing stories and opening questions, conflicts, and disputes on our maps. Hopefully, I will soon be able to present all the geo-spatial data collected by residents and present it in a map platform that would allow connections between different mapping projects, issues, places and people.

Apart from the fieldwork I am conducting in Jerusalem, a significant part of my academic work is concerned with theorizing and contributing to a body of research in STS (science, technology and society) and political theory that focuses on the role of photography and visual technologies in shaping space and power relations. I have presented my work with Public Lab's tools a few times in Israeli Universities and research institutes as well as in the University of Lisbon's Fab-Lab (ISCTE-IUL) and the Citizen CyberScience Summit at University College London. I participated in the 2013 Info-Activism Camp organized by Tactical Technology Collective (TTC), conducted workshops using the aerial photography toolkit, and took part in TTC's film, Exposing the Invisible, which featured Public Lab's activities and tools.

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My engagement and possible contribution to Public Lab's approach to civic science is leaning more towards its social and political aspects rather than its scientific ones. Working with residents and issues in Jerusalem eluminates some of the particularities of doing civic science in the context of political conflict, and in a situation of civil inequality. Public Lab's definition of civic science places scientific inquiry at the heart of civic life by bypassing technical barriers which necessitate the 'professionalization' of science. I would add that civic science places the category of the civil at the heart of the investigation. The question for me is whether our civic science practices can also challenge our understanding of the concept and practice of citizenship, and open new paths for civil life—relations and interactions among people— beyond the boundaries of the state and national identity. I certainly don't have answers to this big question, but I find in my work that, in contrast to the scientific and objective uses and meanings that are attached to aerial photography, when residents I meet are introduced to the possibility of creating aerial images by themselves, their eyes suddenly shine and their imagination is stimulated. Imagining is one important step for rethinking citizenship. The question I work with is, how do we make this imagination thrive?

I don't have any romantic notions on an ideal Open Community or the way technology is going to liberate us from domination. I don't think we can get rid of power structures altogether. I have learned through practice with Public Lab that it's an ongoing process. The techno-scientific activity together with urban and environmental issues we are concerned with are the structure for building that social and political infrastructure that might yield change. As an Israeli activist and researcher, I find the wider community of practitioners extremely important. It strengthens and supports what I do, not only by giving feedback and assistance, but by connecting my work to a wider political and social context, rendering it part of a global movement for environmental and civil rights.

Left Image Credit: Dorit Naaman. *Above Image Credit:* Lea Mauas

Public Lab Kit Initiative

Total kit sales in 2013 were $110,147

In order to make scientific tools accessible, Public Lab offers free online plans for all kits and sells them through various retailers and directly through our online store. Since some of the components of our kits are only available in bulk, selling the kits has made DIY tools more affordable. All proceeds from these kits support the work of the Public Lab nonprofit.

DIY Spectrometry Kits *launched fall 2012*

23,217 spectra uploaded to date via Spectral Workbench
3,238 contributors

Kits Distributed in 2013

A spectrometer may not sound like what you wanted for your birthday, but it's a ubiquitous tool for scientists to identify unknown materials, like oil spill residue or coal tar in urban waterways. A spectrometer is essentially a tool to measure the colors absorbed by a material. But they cost thousands of dollars and are hard to use—so the Public Lab community designed a low-cost, easy to use one.

This open hardware kit costs only $40 but has a range of 400-900 nanometers, and a resolution as high as 3 nm. This one can be constructed from a piece of a DVD-R, black paper, a conduit box, and an HD USB webcam.

Public Lab created open source software (SpectralWorkbench.org) to collect, analyze, compare, and share calibrated spectral data. There's even an experimental version which converts a cellphone into a spectrometer! Public Lab community members are working to differentiate oils, identify dyes in laundry detergent, test plant grow lamps, and analyze different consumable liquids.

***** Became available in November 2013.

Balloon & Kite Mapping Kits *launched 2011*

Over 500 contributors have completed over 1,113 maps, with an average resolution of 31 cm per pixel.

Kits Distributed in 2013

These kits provide a low cost, easy to use, safe method for making maps and ærial images. Over the last two years, Public Lab has built a global community of mappers who are engaged in discussion around the development and use of this tool and its use as a "community satellite" for localized mapping.

Normally, ærial maps are made from satellites or airplanes. The balloon and kite ground-based approach introduces an on-demand capability where events or environmental conditions are mapped at a specific moment in time.

Infrared Photography Kits *launched summer 2013*

72 infrared images uploaded.

Kits Distributed in 2013

Infragram is a simple, affordable near-infrared camera produced by the Public Lab community from a series of collaborative experiments over the last few years, originally developed to monitor wetlands damages in the wake of the BP oil spill. Its simplicity of use and easy-to-modify open-source hardware & software makes it a useful tool for home gardeners, hikers, makers, farmers, amateur scientists, teachers, artists, and anyone curious about the secret lives of plants.

Infrared images can be generated using many inexpensive digital cameras and webcams by removing the infrared block filter and adding new filters. An "infrablue" image is one in which the channels of mostly infrared (and some visible light) are captured in one color channel, and mostly visible light (with some infrared) are captured in another. The Public Lab community has experimented with using both red and blue filters and custom white balances to differentiate these two spectral bands as much as possible.

2013 Workshops & Events

15 Number of participants indicated by blue arrow.
Blue text indicates hyper links.

January

15 WinterCamp (Cocodrie and New Orleans, LA)
Conceptualizing an oil spill toolkit.

6 Balloon Mapping at Fort Mason Green (San Francisco, CA)
Flew modified cameras to produce a multispectral NRG map.

February

40 Mapmaking for Geologists (Asheville, NC)
Learning about balloon mapping, MapKnitter, ground control points, and image classification.

Toolshed Raising (Somerville, MA)
Sessions on spectrometry, thermal fishing bob, and the Riffle.

March

9 Toxics Action Center Environmental Action Conference
(Boston, MA) Hands-on workshop with ærial mapping and photography.

Swamp Stomp at Nichols University (Thibodaux, LA)
Aerial mapping with elementary school children.

Gulf Gathering Kite Monitoring Training (Camp Beckwith, AL)
Review of kite construction principles and mapping the area.

25 August Pine Ridge RC School Mapping Session (Pine Ridge, Belize) Kite ærial mapping session and demonstration of Mapknitter with 5th graders and school staff.

20 Muffles Junior College Mapping Sessions (Pine Ridge, Belize)
Two kite ærial mapping sessions and Mapknitter demo for Junior College environmental club and faculty advisor.

April

10 Southeast Portland Permaculture Convergence (Portland, OR)
Pole photography of urban gardens.

Kite Club Pontchartrain Kick-off (New Orleans, LA)
Review of kite and camera rig construction principles and kite flying at Lake Pontchartrain.

8 Toolshed Raising: MBTA mapping (Somerville, MA)
Successful kite mapping of future Union Square MBTA site.

May

7 Kite mapping at Fort Mason Green (San Francisco, CA)
Advanced field techniques in kite mapping.

22 iFarm IRcam field day (Lee, NH)
Kite flying and ærial photography in a hands-on workshop on a small organic farm, ærial near-infrared photography of crops, and a session on converting conventional cameras into infrared camera.

June

Beit Safafa Aerial mapping workshop (Jerusalem, Israel)

Info Activism Camp (Italy)
Mapping workshop on building a DIY rig for aerial mapping.

12 **NYU's ITP Citizen Science Workshop** (New York, NY)
Case studies on how aerial mapping is used for environmental research.

20 **Open Source Bridge** (Portland, OR)
Aerial mapping workshop utilizing MapKnitter.

20 **UMass Amherst STEM Digital conference** (Amherst, MA)
Workshop on near infrared imagery and Infragram for high school science teachers from around the country.

July

12 **Distance spectroscopy for refinery flares with NASA**
(Chalmette, LA) Kick-off event for collaboration with NASA DEVELOP for work on a long distance spectrometer designed to look at emissions from oil and natural gas production and processing sites, particularly refinery flaring.

15 **WATERCHESTNUTS** (Amherst, MA)
Identifying and assessing invasive species on Lake Warner, MA using aerial imagery

August

5 **Rhode Island Mini Maker Faire** (Providence, RI)
Public Lab, PVOS, and HackerFarm01007 presented DIY spectroscopy and DIY helium blimp construction for aerial imagery at a booth to Faire participants.

30 **Maker Talks at the NYC Makery** (Brooklyn, NY)
Case studies of Public Lab toolkits, citizen scientist experiments, and Infragram presentation.

September

LEAFFEST (Salisbury, Vermont)
An open gathering of the Public Lab community to work on environmental tools and share ideas about environmental science and activism.

30 **Citizens without Borders and UCL ExCiteS** (London, UK)
Spectrometry and aerial mapping workshops.

October

50 **Annual Barnraising** (New Orleans, LA)
In the spirit of bringing a community together to collectively raise a structure such as a barn, Public Lab gathered in-person to develop tools, toolkits, supporting materials such as guides and tutorials, test the tools, and develop new research directions and projects. The theme for the 2013 Barnraising was 'education.'

4 **Aerial Photography of Bayou Bienvenue Shoreline Planting**
(New Orleans, LA) Demonstration of balloon mapping techniques and documentation and support of the many neighborhood and environmental groups' effort to re-vegetate the wetland triangle.

7 **MapKnitter Club** (New Orleans, LA)
Public Lab Gulf Coast and LSU CSS discussed how to implement a "Cartography Collective" and stitch maps of the wetland triangle.

25 **Cartography Primer No. 1 at Phats Valley Residency** (Truro, MA) Aerial mapping workshop of Pamet Marsh railroad breach and oyster restoration in Cape Cod.

4 **Aerial Monitoring of Wetlands at Bayou St John**
(New Orleans, LA) In support of Dredgefest, LA, LSU CSS helped with mapping and MapKnitter stitching to produce a map of the area.

San Diego EWB Regional Workshop 2013 (San Diego, CA)
Simple aerial photography session for map-of-the day techniques for Engineers Without Borders teams.

November

Toolshed Raising at Parts & Crafts (Somerville, MA)
Local Boston area gathering focused on oil testing tool development.

MediaLab Prado (Madrid, Spain)
Aerial mapping workshop and foldable spectrometry design.

20 **Infragram Presentation at ICT4Ag Conference**
(Kigali, Rwanda) Near-infrared plant health imagery presentation at a conference focused on new technologies in support of rural agriculture in Africa.

4 **Aerial Monitoring of Cypress Restoration** (Venice, LA)
March photos and map created in support of Restore the Earth in South Pass and Louisiana Department of Wildlife & Fisheries' restoration efforts.

December

6 **Bayou Bienvenue Cypress Restoration monitoring**
(New Orleans, LA) Aerial mapping workshop with LSU CSS.

4 **Oil and Gas Canal Restoration Monitoring** (New Orleans, LA)
Discussion of low-cost aerial monitoring of plants and animals attuned to National Park Service needs, marsh aerial photo and map and documentation and support of the NPS's marsh restoration with NPS staff.

9 **Gulf Restoration Network Kite Club** (Weeks Bay, AL)
Introduction to kites and monitoring,

20 **Junction Avenue School READY field day** (Livermore, CA)
Simple aerial photomapping field trip for middle schoolers.

THANKS TO OUR 2013 FRIENDS, PARTNERS AND COLLABORATORS!

Partners in the US in purple.

Barataria Bay Mapping Project (Barataria Bay, LA) Big thanks to the boat captains that donated their time and resources including: Richie Blink, Captain Jody Donewar, Zach Mouton, and David Bourgeois of Big Dog Fishing Charters.

Belize Open Source - Sustainable Development (Belize) BOSSD is a non-profit that promotes environmentally and socially sustainable development. It is based on an open source approach to plan, implement, and participate in a land-based learning and community outreach center and working farm on a 40 acre property in northwestern Belize, near the village of August Pine Ridge.

Ben-Gurion University of the Negev (Beer-Sheva, Israel) Ben-Gurion University of the Negev aspires to be among the best inter-disciplinary research universities in the world, a leader in scientific innovation, inter-disciplinary research and applied sciences – all of which impact daily life.

Bezalel Academy of Arts and Design (Jerusalem, Israel) Established in 1906 by artist Boris Schatz, Bezalel has evolved into one of the world's most prestigious art schools. It takes pride in its numerous generations of graduates – the spearhead of Israeli artists, designers, and architects in Israel and around the globe.

Basurama (Spain) is a non-profit organization that raises awareness of waste production and studies waste as a resource through a series of workshops, public art interventions and multimedia projects where participant/users take active part in the search and selection waste, and the collaborative process of design and construction.

Cape Cod Bay Watch (Plymouth, MA) Our mission is to protect and restore Cape Cod Bay and all its resources. We accomplish our mission by using science, education, advocacy, and the law.

Cypress Hills Local Development Corporation (Brooklyn, NY) With community residents leading the way, the mission of CHLDC is to build a strong, sustainable Cypress Hills and East New York, where youth and adults achieve educational and economic success, secure healthy and affordable housing, and develop leadership skills to transform their lives and community.

Dredge Research Collaborative Investigates human sediment handling practices, through publications, events, and various other projects.

Engineers Without Borders-USA A non-profit that supports community-driven development programs worldwide through the design and implementation of sustainable engineering projects while fostering responsible leadership.

Farm Hack Farm Hack aims to nurture the development, documentation, and manufacture of farm tools for resilient agriculture.

Global Community Monitor (California) Together, with the power of the Bucket, we have won – cleaner air, new laws and regulations, families relocated to safer neighborhoods, children moved to a healthier school, the closure of a notorious toxic facility, and companies investing to improve their operations to reduce pollution.

Gowanus Canal Conservancy (Brooklyn, NY) The Gowanus Canal Conservancy is a community-based non-profit organization that serves as the environmental steward for the Gowanus Canal Watershed.

Gowanus Dredgers (Brooklyn, NY) The Gowanus Dredgers Canoe Club is a volunteer organization dedicated to providing waterfront access and education related to the estuary and bordering shoreline neighborhoods.

GreenStart (NH) GreenStart's mission is to foster a resilient energy and food system for New Hampshire by providing technical education and practical agricultural examples.

Gulf Monitoring Consortium (Gulf Coast) The Gulf Monitoring Consortium is a rapid response alliance that collects, analyzes and publishes images and other information acquired from space, the air, and the surface in order to investigate and expose pollution incidents that occur in the Gulf of Mexico and Gulf Coast region.

Gulf Restoration Network (Gulf Coast, US) The Gulf Restoration Network is committed to uniting and empowering people to protect and restore the natural resources of the Gulf Region.

HackerFarm01007 (Belchertown, MA) HackerFarm01007 is an open environment for independent and collaborative work in a variety of media. It is a place

for teaching, learning, exploration, and creative expression. There are facilities for woodworking, welding, machining, and electronics assembly, and one acre of open land for small-scale agricultural projects.

Ironbound Community Corporation

(Newark, NJ) ICC's mission is to engage and empower individuals, families and groups in realizing their aspirations and, together, work to create a just, vibrant and sustainable community.

Jones River Watershed Association

(Kingston, MA) The Jones River Watershed Association is a non-profit, member-based environmental organization established to protect, enhance and restore the quality of the natural resources in Southeastern Massachusetts, in particular the Jones River and Cape Cod Bay, for present and future generations, while cultivating effective stewardship of our regional environment through science, advocacy, and education.

LUMCON (Cocodrie, LA) The Louisiana Universities Marine Consortium (LUMCON) was formed in 1979 to increase society's awareness of the environmental, economic, and cultural value of Louisiana's coastal and marine environments by conducting research and education programs directly relevant to Louisiana's needs in marine science and coastal resources and serving as a facility for all Louisiana schools with interest in marine research and education.

Madaa Silwan Creative Center (Silwan, East Jerusalem) The mission of Madaa Silwan is to build a strong, knowledgeable and involved Arab Palestinian community in Silwan, and to provide educational and recreational activities and courses mainly for children, teenagers, and women.

Mamuta Art and Media Center (Jerusalem, Israel) The goal of the Mamuta Project is to advance art projects and to create a framework for artists from different media, as well as curators, architects, designers, and researchers, who wish to create in the spirit of cooperation, dialogue, and technological innovation.

MIT Center for Civic Media (Cambridge, MA) The MIT Center for Civic Media works hand in hand with diverse communities to collaboratively create, design, deploy, and assess civic media tools and practices.

NASA DEVELOP (Stennis Space Center, MS) DEVELOP bridges the gap between NASA Earth Science and society, building capacity in both participants and partner organizations to better prepare them to handle the challenges that face our society and future generations.

Northeastern University Social Science and Environmental Health Research Institute

(Boston, MA) The mission of the Social Science Environmental Health Research Institute is to conduct social science-oriented research, teaching, community engagement, and policy work in the area of environmental health.

NYU CUSP (Brooklyn, NY) The Center for Urban Science and Progress (CUSP) is a unique public-private research center that uses New York City as its laboratory and classroom to help cities around the world become more productive, livable, equitable, and resilient.

Parts and Crafts (Somerville, MA) Parts and Crafts runs hands-on creative arts, science, and engineering programs for kids and adults to help people learn and do and make things.

Proteus Gowanus (Brooklyn, NY) Proteus Gowanus is an interdisciplinary gallery and reading room. Named for the Greek sea god of change and the adjacent Gowanus Canal, Proteus Gowanus acts as an interpreter of culture and place, deepening the community's sense of context and connection. Proteus Gowanus, where Board member Eymund Diegel serves as Archivist, hosts a physical archive of Public Lab Gowanus data.

The Public Knowledge Workshop (Israel) The Public Knowledge Workshop is a non-profit organization whose mission is to release public information and make it easy for the public to meaningfully engage with the data.

Tidmarsh Farms (Manomet, MA) Tidmarsh Farms, a 577 acre private farm situated in historic Plymouth, Massachusetts, combines a large wetlands restoration and conservation project with an operating cranberry bog, a stewardship and technology program, and limited low-impact residential living.

Toxics Action Center (Northeast US) Toxics Action Center's mission is to work side-by-side with communities, providing you with the skills and resources needed to prevent or clean up pollution at the local level.

University College of London ExCiteS

(London, UK) ExCiteS brings together scholars from diverse fields to develop and contribute to the guiding theories, tools and methodologies that will enable any community to start a Citizen Science project to deal with issues that concern them.

UMass Amherst Department of Environmental Conservation and UMass Open Source Laboratory

(Amherst, MA) The Department's focus extends from the ecology and management of fish and wildlife populations, trees, forests, watersheds and landscapes to the physical, social, and policy aspects of conservation involving urban forests, human habitat, and sustainable building. The study of biology, sociology, policy, engineering, building science, and resource management encompasses rural, suburban, and urban environments. The unifying focus of all these activities is on the stewardship of healthy and sustainable ecosystems that provide important human and community benefits.

Wadi Hilweh Information Center (Silwan, East Jerusalem) An Information Center, opened by the residents of Wadi Hilwah that struggle against the Israeli efforts to Judaize the village of Silwan and the Wadi Hilwah neighborhood. The Information center focuses on the use of media, collecting information for advocacy and effectively communicating information that concerns the Palestinian people of Silwan, East Jerusalem.

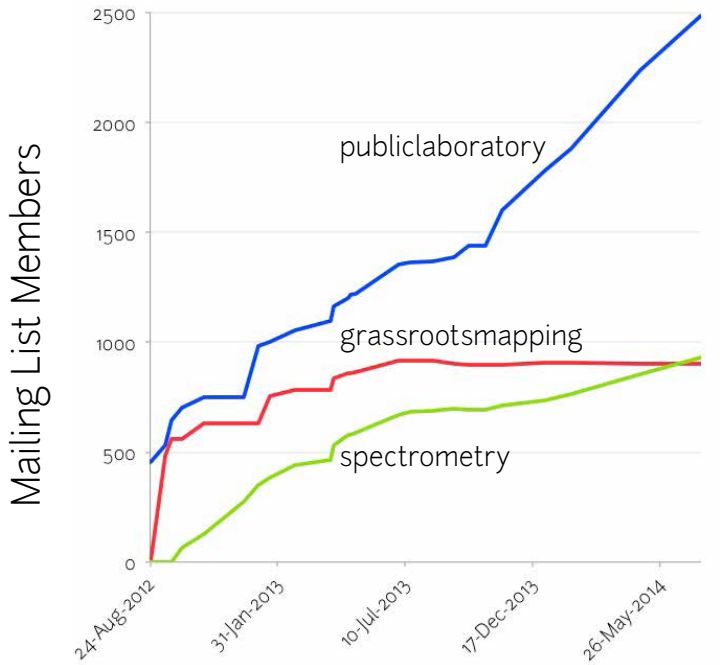
Yovalim Community Council (Jerusalem, Israel) Yovalim is one of 28 local community councils in Jerusalem representing six neighborhoods in the southwestern part of the city. Its main role is to bridge the residents and the municipality to develop an active and engaged community.

PUBLIC LAB AT A GLANCE

Since 2010 PublicLab.org has had:

- 2,305 mailing list members
- 33 different mailing lists
- 1883 research notes posted
- 304 website contributors
- 693 wiki pages posted
- 13,782 wiki edits

550% growth of the main discussion list



11 Active Local Lists in 2013

NYC (179)
Boston (153)
NorCal (95)
Gulfcoast (54)
Amsterdam (44)
South East (38)
Providence (38)
Baltimore (15)
Philadelphia (10)
Jerusalem (10)
Chicago (new)

A Sampling of the PublicLab.org Topical Discussion Lists

grassrootsmapping The place to discuss everything about balloon & kite-mapping (since 2010).

plots-spectrometry Spectrometry and spectral analysis discussions (since 2012).

plots-infrared Near-infrared imaging and vegetation monitoring discussions (since 2013, now >125 members).

plots-waterquality Water quality discussions, including thermal plumes and "the riffle" (started ~ October 2013).

plots-airquality Discussion list for air quality related topics. This started for a project with the EPA and is now open to all (since summer 2012, currently ~50 members).

plots-potentiostat Measuring heavy metal concentrations in water and food.

plotz-3d Everything about 3D printers, especially the Replicator 1s that were donated to Public Lab by MakerBot Industries.

plots-dev Group for people interested in conceptualizing and testing new web infrastructure for Public Lab, also the location for developers discussing detailed code-related topics (started late October 2013, ~28 members).

plots-education Started at the 2013 education-themed barnraising, this group is for teachers of all varieties.

Writing Working Group Started at the 2013 barnraising, this group is for folks interested in writing articles, conducting interviews, assembling case studies, and more!

Google Summer of Code A logistically-oriented discussion group for Public Lab's Google Summer of Code program.

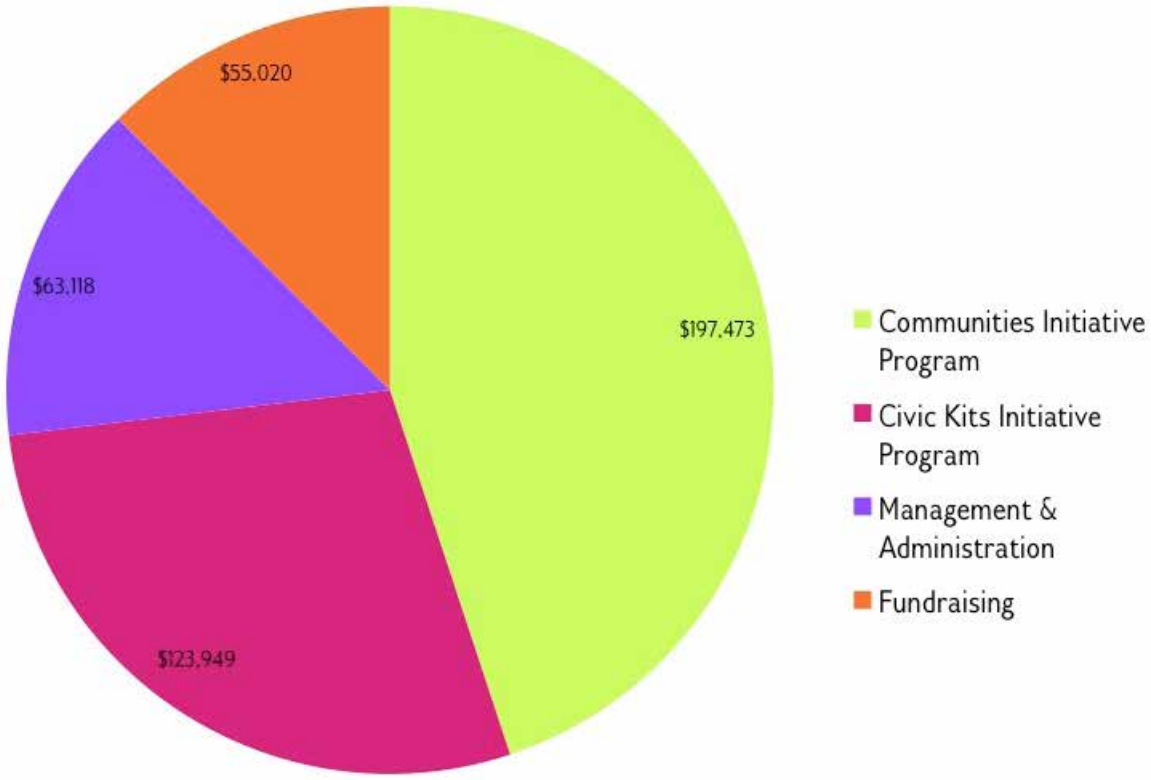
Barnraising! For folks attending and collaborating in person at the annual Public Lab barnraising.

2013 FINANCES

The Public Lab fiscal year runs from June-July. The finances listed below have not been CPA reviewed. For reviewed fiscal year statements, please email shannon@publiclab.org.

Total Expenses

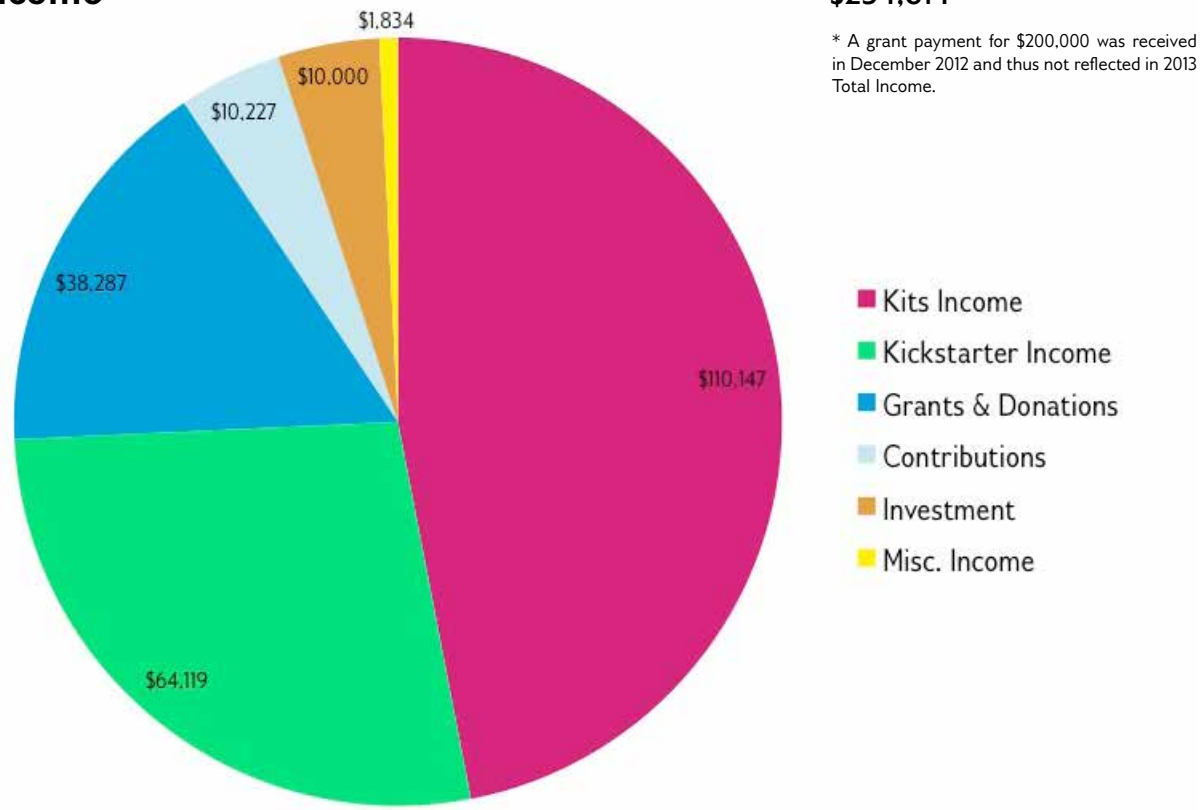
$439,560



Income

$234,614*

* A grant payment for $200,000 was received in December 2012 and thus not reflected in 2013 Total Income.



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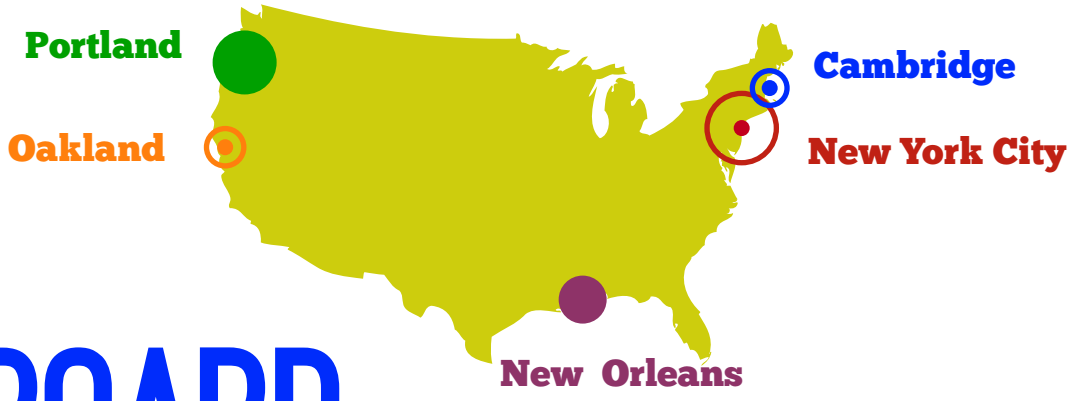

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Community Organizer

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MIT Anthropology Associate Professor

PUBLIC LAB ORGANIZERS

Public Lab organizers are leaders in the Public Lab community, and have an interest in the way our community collaborates and grows. Typically, but not exclusively, these are people who are both key organizers in their local communities as well as key contributors to the broader Public Lab community through work on things such as the website and communications. Organizers often host events or moderate discussion lists, and help shepherd the Public Lab community in other ways. The organizers list is always expanding; anyone can be nominated or nominate themselves.

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Geographer

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Belize Open Source Sustainable Development

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Waltham MA
MIT Center for Civic Media

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Brooklyn, NY

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Open Trash Lab

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Chief Data Scientist

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University College of London

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Bilbao, Spain + Madrid, Spain
Basurama, Montera34

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Rio de Janeiro, Brazil

Kalyn Rosenberg
Mexico City, Mexico

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Harta Consulting & University of Arizona

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Cullowhee, NC

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Davis, CA
Geospatial Scientist

Juan Pablo Torrente
Asturias / León, Spain

Stefan Unterhauser
Somerville, MA

Karen Vale
Plymouth, MA

Gabriel Jaime Vanegas
Bogota, Colombia

Will Ward
Boston area, MA

Stu Williams
Australia

Gena Wirth
New York, NY

Sara Wylie
Boston, MA

None of the amazing things we accomplished in 2013 would have been possible without the help of our supporters. Join our global community as we work to democratize science and environmental investigation!

$50,000+

John S. and James L. Knight Foundation
Rita Allen Foundation

$10,000-$49,999

Environmental Leadership Program through the Geraldine R. Dodge Foundation
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Passport Foundation

$1,000-$9,999

Patagonia

$500-999

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Corporate Support

Google Summer of Code
Rackspace

In Kind Support

MakerBot

Other Financial Support:

Points of Light Civic Accelerator

*Donation made in support of the Infragram Kickstarter campaign.

Donate: http://publiclab.org/donate

Public Lab in the Media

Publications

Public Lab wrote and contributed to three articles during 2013:

"Institutions for Civic Technoscience: How Critical Making is Transforming Environmental Research," Wylie, S., Jalbert, K., Dosemagen, S., Ratto, M. Paper for Special Forum Issue on Critical Making, The Information Society 30(2). March 2014.

Enabling Cities v2: Enhancing creative community resilience: Intro to Citizen Science and Mapping section, "Democratizing Environmental Research", November 2013

"Civic, Citizen and Grassroots Science: Towards a transformative scientific research model." Dosemagen, S., M. Lippincott, L. Barry, D. Blair, J. Breen. 2013. Eds. Offenhuber, Dietmar, and Katja Schechtner. Accountability Technologies - Tools for Asking Hard Questions. Vienna, New York: Springer.

Public Lab was featured as a case study in a Columbia University Tow Center for Journalism report:

Columbia University Tow Center for Journalism report, "Sensors and Journalism." Public Lab featured as one of the case studies and Public Lab Organizer, Lela Prashad contributed a chapter titled, "People within Pixels."

Articles

Public Lab staff and organizers contributed articles to the following sites: PBS MediaShift IdeaLab Blog, UCL ExCiteS, TechPresident and LIMN.

Presentations

The Public Lab community presented work across the globe during 2013, including at the following venues:

Citizen Science Hackfest at MediaLab Prado; Society of Environmental Toxicology and Chemistry annual conference; In Kigali, Rwanda at ICT4Ag; Washington, DC at the Health and Environmental Funders Network conference; World Maker Faire Main stage in NYC; In Buenos Aires, Argentina at Hacks/Hackers BA; At New York City Makery Pop-up Maker Space; In Paris, France at NightScience; In Kansas City at MakerFaire KC; San Francisco at State of the Map US; Columbia Journalism School Tow Center Sensor Journalism Conference; In Davis, California at Tedx; At GEO NYC; Transparency Camp in Washington DC; and at FedGeo Day.