Journal of Mobile Media

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Wi: Journal of Mobile Media 2015 9:01

The online version of this article can be found at:

https://doi.org/10.65968/RWVE7077

Buiani, Roberta. "Biolab-on-Wheels: finding a space for a DIY bio lab in Toronto". *Wi: Journal of Mobile Media*. 9.01 (2015). Web. https://doi.org/10.65968/RWVE7077

Wi: Journal of Mobile Media
2015: Vol. 9 No. 1. Bio-Mobilities Issue

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Introduction

Meet Toronto, the wealthy, entrepreneurial and over regulated city: real estate prices rise as we speak; safety and liability precautions make anything outside of the ordinary bureaucratically complicated and difficult to achieve; and a prerogative of pragmatism and time-efficiency makes its mark on all emerging activities, from technology oriented start-ups, to food Cooperatives, to the first DIY bio lab in Toronto. With the latter in mind, a group of well-intentioned individuals started holding regular meetings. The group gathered at Hacklab Toronto ("Hacklab.to - Toronto's Hacker Collective" 2014), enthusiastically taking it upon itself to learn the biology fundamentals needed to play with living matter.

Despite its predominant interests in digital fabrication and software development, Hacklab agreed to host the meetings of the newly created DIYbio TO. In fact, the experimental plans of the new group, through its commitment to play with biology in non-conventional ways, its aspirations to manipulate biological organisms in the same way people manipulate digital code, were conceptually compatible with the broad understanding of hacking and hacker

culture being circulated since the eighties and nineties. The new ambitions of DIYbio were generally interpreted to be part of that "reshaping of existing hacker culture" that has characterized the DIYbio movement since 2008, when the first labs started to flourish (Delfanti 2013; Tocchetti 2012; Meyer 2012; Maxigas 2012).

Although relatively new in Toronto, DIY biology and citizen science initiatives have become well-established elsewhere, through the demonstrated successes of laboratories such as Genlab in New York City, Biocurious (Biocurious 2014) in the Bay Area, San Francisco, and La Paillasse in Paris (King 2012). Interest and innovation related to DIY biology and open hardware have gained momentum worldwide and the Toronto group enjoyed a steady growth and an increasing desire to set up laboratory in an autonomous space. Members of DIYbio TO had diverse interests: learning and practicing scientific methods and procedures to the benefit of the lay citizen. For example, the creation of tools to detect unsafe or unusual ingredients in food (e.g. horse meat in burgers and other packaged food, or wrongly advertised labeling of fish); the recreation of routine experiments outside the lab (such as PCR or Polymerase Chain Reaction, which is the basis for conducting synthetic biology experiments); the initiation of citizen science through workshops or teach-ins; and, finally, the use of the laboratory and living materials as artistic media.

Although initially supportive, Hacklab was unable to accommodate the aspiring biologists in the already crowded and dusty space. In response, members of

DIYbio TO initiated talks about founding a dedicated DIYbio lab. With the initiation of these conversations, complications began too. A series of brainstorming sessions and preliminary skill sharing meetings were called to determine which projects to prioritize, to make a list of the material and infrastructure needed and to collect donated instruments from members and science students within the group. It was during one of these sessions that two members of the group, Lisa Carrie Goldberg and myself, brought up the possibility of *going mobile*. If we couldn't find a proper space, we could start small by executing basic experiments using a mobile lab equipped with instruments built with the assistance of other DIYbio members, or with instructions downloaded from online repositories such as Instructables ("Instructables - DIY How To Make Instructions" 2014). We could also draw from the experience of interdisciplinary collectives such as Hackteria ("Hackteria" 2014). Making the lab portable would solve the endemic lack of space and eventually cut its prohibitive costs; and it would help define the mandate of the DIYbio TO collective and its future activities.

Figure 1: View of the Biolab-on-Wheels Sept. 2013

However, the idea of portability didn't satisfy some of the participants' imagined approaches to DIY science and seemed to disappoint their expectations on what a DIY biology lab should look like. Consequently, the Biolab-on-Wheels project went ahead as an art piece but it never became an official representative of DIYbio Toronto, even if it constituted for some time the only DIY bio project emerging from the group. While many voiced their approval and interest towards Biolab-on-Wheels, they did not think that they could contribute to the project, nor did they acknowledge the project as an instrument that could be adapted to the initiatives they might have had in mind. This de facto dismissal was not caused by a dislike for the project; instead, concerns regarding risk management and intellectual property issues were voiced. Additionally, disagreements were had regarding the "seriousness"

of the science produced. In turn, these were the very issues that had characterized the ongoing discussions about finding a space for DIY TO. In other words, the Biolab-on-Wheels revealed that the ongoing difficulty of finding an affordable space to rent, although daunting, did not constitute the main challenge to the successful establishment of DIYbio Toronto. The future of the project and the formation of the potential space were causes of most of the disagreements within the group. This brought a momentary halt to any activity that DIYbio TO had envisaged.

Far from indicating failure or insurmountable obstacles, or, worse, a cause for conflict, this situation helped identify the existence of contrasting notions of what it means to do DIY biology. It also brought forth question about what kinds of activities should count as DIYbio, particularly within such a dis-homogeneous group. The proposal to *go mobile* had exposed the diversity and the very discrepancies existing among the members of the group. Interestingly, it showed the extent to which the DIYbio lab reflected, for better or for worse, a certain historical legacy of Toronto as a city of compromise, and the well assimilated neoliberal spirit and the politics that have been carried on in the city since the nineties (Boudreau, Keil, and Young 2009; Kipfer and Keil 2002; Keil 2002). In fact, the processes involved in the formation of DIYbio Toronto (or the momentary failure to form it) were reproducing the very social conflicts between economic models that have dominated the city of Toronto for a long time.

The divergences emerging from this debate also complicated a preponderant origin story that the spirit inspiring the DIY bio movement is a continuation of the hacker spirit generated in the eighties and the nineties (Delfanti 2013; Kera 2014). Despite some validity with this story, the disagreements that have slowed down the formation of the DIYbio community in Toronto call for further exploration of the diverse set of motivations and complex cultural intersections determining its so-called Hacker spirit. The social backgrounds and the aspirations of subjects who were involved contributed to the many understandings of hacking, DIY and science.

With these elements in mind, this essay is an insider's story, an auto-ethnographic and critical account documenting the challenges to the formation and coming together of the specific Toronto DIYbio community. As an active participant of the DIYbio collective, I consider this – sometimes frustrating and sometimes exhilarating – experience neither concluded, nor failed. On the contrary, I deem it as an important phase in the formation of a much larger and complex movement; a movement whose formation cannot be explained using some trite formulas and generalizations about hacker culture or DIY culture, but is tightly and unavoidably dependent upon, and constantly re-shaped by, its unique social, economic, and historical context.

DIYbio labs as convergence of different knowledge and goals

In an article on the DIY movement in Asia, Denisa Kera describes how hacklabs and hackerspaces have been ".. offering unique opportunities for translation

between scientific knowledge produced in the labs (official academic and research institutions) and the everyday interests, practices and problems of ordinary people in diverse local contexts around the globe"(Kera 2012, 2). Fusing often-diverging cultures and systems of knowledge, "indigenous practices of knowledge creation" and "metaphysical and scientific search for truth or other ontological goals," DIY labs and maker communities can be understood as spaces where the "local, parochial, rooted, culturally specific and demotic may co-exist with the translocal, transnational, transcendent, elitist, enlightened, universalist and modernist" (3). Kera provides evidence for such claim through two examples from the local DIYbio initiative and hackerspace communities in Singapore and Yogyakarta. While the first "..works within the local rural context" integrating "various communities around science issues and technological challenges", the second "..is predominantly active in entrepreneurial initiatives" (3). The product of different communities of practice and necessities, these two initiatives demonstrate that "the way in which society and science are integrated in varying degrees in these projects is based on the local context"(3). This is made apparent not only by the spaces they create or the audiences they engage, but also through the design and aesthetics of the objects and the instruments produced in these spaces. Both hardware design and the choice to undertake a particular project tend to carry stylistic and design references that are familiar to a certain community, encouraging potential users to become involved or to lend their expertise and labor. Establishing a connection between scientific material and everyday life

both help defuse the aura of secrecy that institutional science tends to perpetuate, and promote confidence in those processes and operations once thought to be completely out of reach for the regular citizen. Science then exits the closed doors of the academic institution and private laboratories and becomes porous, incorporating myriads of external influences.

Following this trend, the hackerspace in Singapore surfaced as the locus where business, art and design, and local traditions merged to complete particular projects, whose purposes sometimes converged. Reflecting its wealthy demographic of entrepreneurs and designers, the Singapore DIYbio meetings tapped into the culture of food in a city where eating has a substantial significance in shaping the identity of its citizens. DIYbio initiatives then engaged with food science, molecular gastronomy, and a number of culinary novelties such as sous-vide cooking with hacked rice cookers prepared by personality chefs (Kera 2012). Meanwhile, the Yogyakarta hackerspace, in collaboration with the university and a team of artists, organized DIYbio workshops that introduced safe brewing techniques, by merging scientific protocols, traditional knowledge and artistic practice. This collectively conducted initiative became a form of protest against the new taxes that the Indonesian government had imposed over wine and beer, forcing the local population to engage in unsafe and often deadly attempts at distilling and brewing on their own. Using low cost laboratory infrastructures and microscopes fabricated with material with which the locals were familiar (such as cheap webcams) rather than expensive commercial-grade equipment, this

group of DIYers secured the attention of a community of locals and non-scientists. In order to improve dissemination of new skills and methods, the Yogyakarta DIYers built a portable kitchen for brewing. In addition to ensuring that scientific knowledge circulated locally, this portable lab sent the fundamental message that individuals didn't need to reach a proper laboratory in order to practice science: science would reach out to them, beyond its assumed isolation and immaculate walls, serving the communities that needed it directly.

Many of the premises informing the Singapore and Yogyakarta initiatives can be found, and have served as inspiration for the DIYbio group in Toronto. Several aspects in particular seemed to resonate with the specificity of Toronto. In both cases, groups of individuals with different skills and experiences had collaborated in shaping the aesthetics and production of DIY science: the first focusing on technological innovation through novelty food, the second producing new methods to solve problems that mostly affected local communities. Toronto embodies both aspects: it is a city where small businesses, start-ups and high-tech incubators proliferate. At the same time, it is a city rich of grassroots organizations keen to disseminate and exchange local and indigenous knowledge. The connection that the two South East Asian labs had established with their communities by appealing to different modalities of interaction and sharing processes could act as an effective model simultaneously resonating with, and initiating dialogues among, the diverse pockets of knowledge that characterize the multicultural population of Toronto.

The idea for a mobile lab seemed at the time an excellent opportunity to define the identity of the nascent DIYbio community as a tool that worked to disseminate, exchange and learn, simultaneously giving and taking the different intercultural, interdisciplinary and intergenerational knowledge existing in the city of Toronto. Its ability to move would facilitate a better access to public spaces and unconventional areas of the city such as parks or remote neighborhoods. Although the mobile lab project went ahead, it never became an official poster child for DIYbio TO. Instead, it became a work in progress on its own and an artistic project with which its DIYbio community never identified fully.

In fact, unlike the two South East Asian cases, whose entrepreneurial spirit and goals linked to specific needs merged in well-defined projects, thus establishing, individually, strong ties with various communities of practice, Toronto started with no particular project in mind and a group of individuals representing diverging cultures and intentions. In addition, a mysterious inflexibility prevented the creative spirits of the entrepreneur, the artist, and the community activist from reaching any agreement, while the apparent lack of a strong goal towards which to work all together effectively kept them running in circle.

Toronto's peculiar ecology

Although marked by different challenges, aspirations, and material circumstances, DIYbio TO manifests the same diversity as the examples

illustrated in Kera's South East Asia analysis. Like the South East Asian examples, DIYbio TO does not have a monolithic, coherent structure where a handful of selected individuals decide on a limited number of projects to be undertaken, but as a complex ecology of different and often contrasting forces all converging into the same place. Felix Guattari writes that any industrial, technological or natural phenomenon is never a product of random intersections, but involves a complicated overlapping of enunciations of subjectivities. Ecology "subsumes all existing ways of domesticating existential territories - intimate modes of being, the body, the environment, the great contextual ensembles of ethnic groups, the nation, or even the general rights of humanity"(Guattari 1989, 140). While it is necessary to acknowledge the contribution of different processes of subjectivation (mental ecology) in modulating and intersecting ecological assemblages, it is also important to understand the circumstances (environmental ecology) and the power relations (social ecology) that bring forth such processes. In other words, "if we are to understand the interactions between ecosystems, the mechanosphere, and the social and individual universes of reference, we have to learn to think 'transversally'," that is, to identify "the basic antinomies that exist between the ecological levels" (141).

While the Asian hackerspaces had found ways to put their resources towards specific projects that appealed to different parties, Toronto has not reached that stage yet. Its DIYbio members have yet to negotiate any direction to take, they haven't made any decision about projects that would resonate with

different individuals and aspirations, and they haven't been able to decide whether they should support commercial products or academic projects, aesthetic objects, or socially valuable artifacts. In Toronto, contrasting needs and desires resulted in a double drive that aspired to simultaneously break away from, and conform to, scientific protocols and procedures. Furthermore, a profoundly inherent attachment to the cultural and economic ethos that dominate the city prevented the group from committing to any collective plan that would withdraw from such ethos. Thus, the discussion surrounding the creation of the DIY lab laid bare not only the absence of a collective set of goals to be channeled into one or two distinctive projects. It also showed that what prevented any meaningful and productive agreement was only partially caused by the curious mix of artists, scientists, hackers and entrepreneurs gathering at the DIYbio TO meetings. Nor was it merely originating from the frustrations of not finding a proper space for the group. In fact, despite its use as an excuse for "things not happening", the most important issue preventing the creation of a DIYbio laboratory was to be found in the extent to which the different individuals involved in this initiative had internalized (or refused to accept) the social and economic conflicts inherited from the culture and the historical traditions of the city.

These conflicts emerged when concerns about safety, ownership and reliability were trumping the desire to experiment with new material, to take apart, to hack, and to reconfigure instruments for the sake of pure exploration or for the benefit of a larger community. The impulse to make science public and

accessible through creative and artistic projects, rather than by means of precise and properly calibrated instruments caused suspicion: doubts were voiced whether the use of improper or makeshift instruments would reproduce scientifically sound results, thus running the risk of casting a negative light upon the reputation and reliability of the nascent DIYbio community.

Although no decision had been made regarding any activity, equipment, or chemical substances to store in the potential new space, some members were very much focused on avoiding, by anticipating, risks that could arise in the undetermined future: safety and intellectual property became the two major issues leading the debate. There was a generalized anxiety to comply with administrative procedures, as failure to do so could have caused much damage to the emerging activity of the lab. More concerns were raised regarding the risks of being defrauded of intellectual property over new “products” that may have originated from single members of the still-non-existent-lab. One could argue that these precautions and concerns about safety are justified when an activity predominantly conducted in the sterile and well-protected lab is transferred into a garage or a semi-public space. Lack of expertise, hazardous or careless behaviour, or the tentative nature of some experiments can indeed constitute a serious danger for a group of amateur or inexperienced scientists. Hence, it might be necessary to increase the space's safety policy and danger warnings. However, the no-risk policy directed toward preempting potential emergencies or imaginary events proposed during the preliminary DIYbio meetings seemed to be more about saving money, rather than protecting (or

preventing any damage to) the physical safety of its members. In fact, potential risks (from fire hazards, chemical plumes, flooding, damage to the equipment) could be source of financial loss from fines, lawsuit or higher insurance premium.

These concerns might have seemed preposterous at a time when not only space availability remained a hypothesis, but no clear plan about any project had been made. However, they were likely the product of the internal dilemmas emerging from the needs to steer clear of liability and to seek legitimation from the big industry proper of a small business mentality, vis-à-vis some enthusiastic urges to achieve something unprecedented and radically innovative. Inadvertently yet unavoidably, this attitude is common among the culture of thriving start-ups in Toronto –the product of the rather merciless neoliberal imperatives that have transformed the city in the last couple of decades (Boudreau, Keil, and Young 2009). In addition, these habits reflect the principles of a forecast-and-control driven society that tends to keep novelty and transformations under the grip of calculated risk assessments and strict management, shaping Western cultures since the advent of global travel, international commerce as well as the intensification of migratory flows (Adam, Beck, and van Loon 2000; van Loon 2002).

The legacy of Toronto as a substantially conservative city is certainly not new. Some (Ruppert 2006) have traced orientation in its past as a bastion of Nineteenth century Victorian morality, hence its nickname “Toronto the Good”,

a characteristics that also distinguishes the city from and sets it in competition against, the innovative and historically more popular Montreal. Others (Kingwell 2005) have mentioned its status as an academic city, that is, a city where political discourse is devoted to debate rather than proactive "doing", as "..reasons given are most often for not doing things, not for doing them. Blockage is progress; resistance is self-evident; ambition is suspect" (61). While Toronto's past might have helped cultivate its current fear for risky innovation in favour of a certain taste for the status quo, the neoliberal transformations in the past twenty years have no doubt contributed to the consolidation of this trend.

In his text about the effects of the neoliberal politics by the Harris Government in the eighties and nineties in Ontario, Keil observes how "in Toronto, entrepreneurial planning has been supplanting and reconfiguring the reform-oriented planning practices that grew out of middle-class-centred citizen movements in the 1960s and 1970s and continued to shape Toronto's tradition of civic reform until recently" (Kipfer and Keil 2002, 229). This resulted in a forced radical reconfiguration of the industrial scene in Toronto. Furthermore, cuts in the arts and the non-profit sector were not matched by an equal increase in subsidies. Accompanied by a steady real estate hike, this move served to "undermine the potential of non-neoliberal projects at the local scale, while engendering a lemming-like rush towards urban entrepreneurialism, which itself would only serve to facilitate, encourage, and even publicly subsidize the accelerated mobility of circulating capital and resources" (Peck

and Tickell 2002, 385). As a result, many innovators who had previously worked in the non-profit sector were compelled to follow a more entrepreneurial route.

Keil et al. (2002) note that the radical de-vestment and privatization of the public and no-profit sector resulting into the effective neoliberalization of the city corresponded with the establishment of new rules governing urban everyday life (578). The result was the dismantling and de-regulation of post-WWII Fordist-Keynesian modes of regulation during the 1980s, characterized as "roll-back neoliberalism" (Peck and Tickell 2002, 384), in favour of the creation of new institutions and regulations of the state and society – the phase of active state-building and regulatory reform of "roll-out neoliberalism" (385). As the lack of financial incentives in the non-for-profit sector resulted in the proliferation of start-ups and small social enterprises, operating under the imperatives of innovation and competitiveness, then new regulations had to be put in place in order to enable these new entrepreneurs to conserve their financial energies and, importantly, to improve their chances of survival.

In many cases, this meant introducing "new policies and governmentalities seeking to spread the use of market metrics to ever broader realms of the social world"(Graefe 2005, 11), while still maintaining forms of socializations and "processes, organizational forms and values of for-profit firms"(12): newly formed enterprises would create informal and worker friendly work environments that protected themselves from potential liabilities and

unexpected events through risk assessment exercises and the marketization of social relations through the protection of intellectual property and the transformation of any activity into potential business. In other words, while the proliferation of new start-ups happened under the auspices of innovation and production of wealth, this innovation was not allowed to grow unrestrained, but was delimited within given parameters. While the realization of this very scenario was generally not desirable for the majority of members of DIYTbio Toronto, who would have preferred to be free to conduct their activities freely, its rules kept coming back in order to "protect" (make safer) the activities of this new initiative as well as to encourage its growth.

DIYbio TO: ambitions and compromises

Members of DIYbio TO appeared to split between those agreeing with strictly law-abiding agendas and those who insisted that the new lab should be created in the spirit of sharing and do-it-together, and should feature creative appropriations of home-found appliances and made-up objects among professional instruments. In reality, the two positions had the same end results in mind. However, the way in which these ideal conditions would be reach did not coincide, causing dissents or indifference for other people's ideas.

A few members of the DIY group demanded that internal rules be established in order to protect the lab against any liability, had there been any accident or any unauthorized or careless use of materials. These rules were proposed with the intention of speeding up the activity and making sure that accidents id not

hinder the completion of a project. In claiming that a set of regulations should be established regarding intellectual property (IP), these members hoped to avoid in-fights and dreaded cases of plagiarisms.

The focus on IP rights seemed to be at odd with the quest of openness and collaborative spirit that had brought some individuals to join the Toronto DIYbio group. In fact, this attitude was not the sign of closure or selfishness, but reflected a deeply internalized marketization of social relations proper of roll-out capitalism, clearly evidencing neoliberal science's "..intense fortification of intellectual property in an attempt to commercialize knowledge, impeding the production and dissemination of science"(Lave, Mirowski, and Randalls 2010). Giving a monetary value to one's work does not equal refusing to share it, but is an attempt to share it more safely, by protecting it from fraudulent actions or appropriation. As Evans notes, this approach is typical of those scientists participating in private science (Evans, James A. 2010, 259).

Other members of DIYbio Toronto appeared to have a somewhat more relaxed, and therefore more "risky" attitude towards experimenting with biology and science in general. These individuals had no specific plan to produce fully functional or commercial products: their interests lied in working collectively with whatever material or equipment was available, while paying no particular attention to protecting their personal work or to making mistakes that would undermine its practical outcomes or the timely creation of a product. Their lack of experience with science might have justified their naïveté and disregard for

safety hazards and science protocols. Yet, this approach was conscious, as it was led by an interest in the process of science and its socialization, rather than in reaching concrete results; it expressed a discomfort towards the system of rules and suggested trajectories supported by the institutional science and the private sector.

Generally speaking, all members of DIYbio TO had gathered around the concept of DIYbio to make research and experimentation in biology open, shareable, and accessible, enabling amateur scientists and non-scientists to pursue research of interest to the public and to the local community that had been ignored or underestimated by big science because deemed marginal or non-lucrative. However, for some DIYbio members needed a seal of approval legitimate the research. Thus, it had to adopt the regulations and protocols typical of official science in order to guarantee its empirical reliability and potential competitiveness. The idea that DIYbio could still produce excellent results and lead to innovation (i.e. be competitive) meant that it had to be conducted using proper instruments, not toy webcams or Styrofoam incubators. The other portion of the group followed other research modalities: the goal in this case was to hand science to the community by making it instrumentally approachable; to engage in collaborative projects that did not speak to the scientific community exclusively but to the public at large, by eliciting and unlocking different sources of knowledge; to create hybrids at the intersection between science, the arts and community building, rather than science kits and top-down products.

Issues arising from divergent approaches are recurring, and constantly being negotiated within growing and established DIY communities. Initial plans have to be re-written with a variety of individuals and intents in mind. In the Asian cases mentioned by Kera, the intersection of scientific practices, artistic approaches and indigenous traditions seemed to coexist around items strongly defining a certain identity or specific problems to be solved. The groups comprising DIYbio Toronto haven't found any project catalyzing everybody's interest yet. However, this impasse does not originate from material disagreements, but from our identification with communities of practice that have grown by principle increasingly separate. Obligations towards these communities of practice have caused attrition and lack of understanding to persist, preventing any proactive initiative at DIYbio TO. Thus, the tendency to align with the governing rules and the competitive spirit of the industry was met with suspicion and ridiculed as exaggerated by those who believed that these rules would not lead to any benefit. Conversely, the lack of focus and scientific accuracy, and the excessive interest in community involvement of the latter were considered unsafe, careless, and even damaging by the former.

Building a mobile lab

We proposed the Biolab-on-Wheels as a momentary substitute of a proper infrastructure. Considering the major challenge to find a space in the unaffordable real estate scene of Toronto, this idea initially appeared to be a possible solution. Drawing on the example of the pushcart kitchen presented in

Yogyakarta by the Hackteria collective, we fit a bike trailer with a red box that would contain and display material from the DIYbio collective.

Figure 2: The Bike Trailer

The goal of the Biolab-on-Wheels was to make basic projects possible, to build and showcase open hardware modelled after instructions provided by other DIYbio laboratories. The bright red colour of the box was meant to make DIYbio TO visible to both the general public and to individuals willing to join the group.

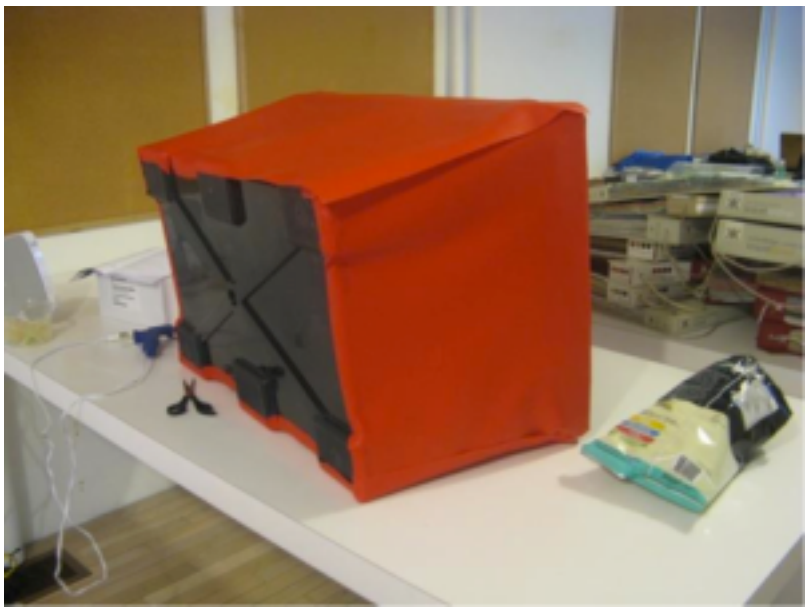

Figure 3

Figure 4

While the rest of the group was engaging in discussions about possible projects to realize in a still-non-existing new space, the Biolab-on-Wheels started touring the city, accessing two major green areas, The Don River Valley and High Park.

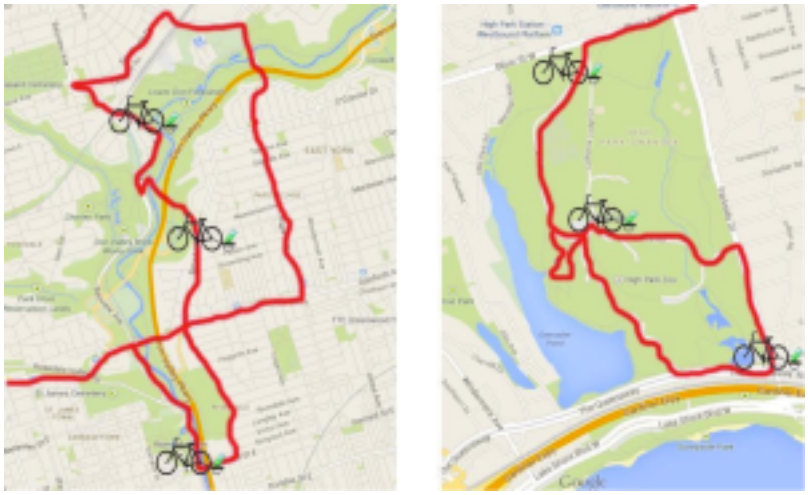

Figure 5: Biolab-on-Wheels park tour. The bike symbols indicate locations of interaction with the public. Left: Don Valley. Right: High Park .

These tours were guided by a search of samples of water, insects and plants which could be collected and stored in test tubes and petri dishes,

Figure 6: Sushi bamboo mat repurposed as test tubes holder

Figure 7

and could be examined using microscopes built with hacked webcams and augmented mobile phones.

Figure 8: Webcam microscope (with instructions from Hackteria.org)

During the tours, passers-by strolling the park would become curious about the red box and would inquire about its content and purpose. This moment was a double educational experience: the visitor would be able to explore the life populating the park by either observing its diversity or by examining its microscopic beauty. In turn, the Biolab-on-Wheels started collecting practical

information provided by the visitor, who would often indulge in fascinating stories about the park, tips about mushrooms, edible and medicinal plants, wild critters and dangerous spots infested by poison ivy and the infamous giant hogweed (City of Toronto 1998), a newly found invasive plant with toxic properties recently found along the Don river. This information was collected and re-circulated when the lab would reach other parts of the city, becoming a modest archive and a sort of lab book of the wilderness.

The initial goal of the mobile lab was to conduct biology experiments in the wild, such as measuring the salinity of water, or examining the microbial diversity of nature. However, given the positive response it triggered in the park visitors who gladly asked questions and provided useful lessons, the mobile lab gradually became a tool meant to disseminate and collect information about natural science. In addition, it naturally morphed into a viable device to encourage the exchange of different forms of knowledge and perspectives about nature, the environment and sustainability. Furthermore, it showed that the biological didn't need to exist in a secluded space in the lab in order to be appreciated in its complexity, but could also be enjoyed outdoors.

The Biolab-on-Wheels was deemed inadequate to represent the entire DIYbio community. In fact, its role was constantly repurposed to suit the changing circumstances of each exploration, by increasingly emphasizing the relational aspects emerging from its encounters with different communities, rather than taking the opportunity to speak for the endemic need for affordable space in

Toronto, or highlighting the absence of a proper laboratory to accommodate the DIYbio TO project.

The Biolab-on-Wheels was never considered a bona fide representative of DIYbio TO. Its focus on natural science and its low tech configuration did not satisfy the overall interest of many members in the recent developments in synthetic biology, an area that had been at the core of the incredible growth of the very DIYbio movement and that particularly appealed to wannabe scientists, programmers, and hackers. Following the discussions and the disagreements on how a laboratory should look, for many, the portability of the Biolab-on-Wheels was problematic: it constituted an impediment for the development of serious experiments, as it not only failed to accommodate the equipment (expensive and in need of a power source) required for some of the experiments, but it also would most certainly produce tentative and inaccurate results. Importantly, the social interactions that the Biolab-on-Wheels had entertained contained a strong performative component: it relied on the rather loud appearance of the red box, and engaged in exchanges and friendly dialogues with the passers-by. As a result it was not exclusively focusing on research. Thus, for many, the portable lab was a "mere" art installation, and a frivolous experiment: it could not be used for serious scientific purposes, since it did not provide any conventionally speaking innovation in science, it did not produce toolkits or instruments that could be monetized, and it was definitely not safe to run.

Admittedly, the Biolab-on-Wheels was conceived as a playful art project rather than as a serious scientific experiment. However, this particular configuration was assumed to fit the idea of hacking as turning scientific instruments into art, repurposing kitchen items for science.

Figure 6: Sushi bamboo mat repurposed as test tubes holder

Figure 7

Clearly, this notion of hacking did not coincide with what many young hackers and entrepreneurs in the DIYbio collective had in mind: a DIYbio lab had to be utilitarian and efficient by nature. This implied filling a space with "properly functioning" professional equipment, and learning how to reproduce and perfect popular experiments autonomously. What needed to be hacked was the concrete result and the recipient of the experiment, not the instruments used. Going mobile would be a limitation, as the lab would neither look nor operate credibly, unless serious research could be done to retrofit the box and turn it into a real, credible, and possibly sleek apparatus. This focus on doing things

professionally was no attempt to question the processes, the rituals and the technological determinism of science. While reproducing experiments was important, it was even more crucial to demonstrate that it was possible to conduct some at home without professional material and perfectly calibrated machinery; whether instruments could be reverse-engineered using home-made material.

A Work in Progress

Despite the skepticism of some DIYbio members, the project was never rejected. In fact, while most members were simply not interested in adopting it as a preliminary substitute for a real lab or in improving its imperfect appearance and functionality, they recognized its potential. The project made its first appearance at the Toronto Maker Faire on September 21-12 2013. Here, it was considered an odd novelty among the endless line-up of 3D printers, high tech and mechanical inventions, sparking curiosity among kids and science teachers, who inquired about its uses for educational activities and naturalist fieldwork. On October 4 of the same year, the Biolab-on-Wheels debuted as an art installation in the Eco-Nuit Blanche event. The project continued its park tours in the Summer 2014 and a new prototype is now being re-designed as an educational and artistic piece due to launch in the Spring 2015. Importantly, some members of Hacklab warmed up with the idea of building a portable lab and became involved designing this new prototype using light material and waterproof fabric.

Thus, despite its initial skepticism of the DIYbio community, the Biolab-on-Wheels has nonetheless catalyzed the attention of a number of individuals. This late and gradual acceptance is a sign that the DIYbio community is ready to grow. Letting different individuals pitch their ideas for the portable lab and allowing for experimentation with different materials that accommodate the skills and interests of the community might ultimately produce a common project. Thus, the creation of the first instance of the Biolab-on-Wheels was not a failure after all, since it led to the realization that the discrepancies existing within the DIYbio community were driven by similar principles of openness and collaboration, which were interpreted differently and achieved through different modalities.

A further and very encouraging proof of resilience of DIYbio TO can be observed in the recent rise of a number of initiatives initiated independently by some members of the collective. As Hacklab moved to a much wider space in the west end of Toronto, there have been talks about creating a "wet space" dedicated to DIY biology. Lisa Carrie Goldberg successfully opened a space for the dissemination of science to kids and young adults. During the Fall of 2014, Justin Pahara led a series of community based open science experiments at Synbiota, a new startup dedicated to the development of synthetic biology solutions. These initiatives, although distinct by nature and procedure, often feature participants from the initial DIYbio group, testifying to the ongoing development and increasing sophistication of the DIY biology community in Toronto.

Acknowledgments

This article would not be possible without the help of the very community mentioned here. In particular, I would like to thank Eric Boyd, president of Hacklab, Lisa Carrie Goldberg, from Action Potential and Justin Pahara CEO of Synbiota, for their generous and frank comments.

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