Original Article

Science, Technology, & Human Values
1-29

DOI: 10.1177/0162243915589634
sthv.sagepub.com

Is an FBI Agent a DIY Biologist Like Any Other? A Cultural Analysis of a Biosecurity Risk

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Abstract

Biotechnology's promises has been widely recognized as a major enterprise accelerating the commodification of the biological. After the 9/11 events and the subsequent anthrax letters, biotechnologies have additionally been described as contributing to the construction of biosecurity risks. This paper proposes to investigate the collaboration between the FBI and the DIYbio (Do-It-Yourself biology) network as a case study illustrating the productive entanglement of biological risks and promises. To do so, the paper explores the social construction of risks and promises associated with the vision of distributed biotechnologies as enacted in this collaboration. We argue that the FBI needs to police the DIYbio network in order to disseminate a specific notion of bioterrorist risk, while, in a counter-

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intuitive manner, the DIYbio network benefits from being policed by the FBI as it helps them disseminate their socio-technological vision. If the entanglement of technoscientific risks and promises is a well established finding of the STS literature, our case study suggests that such entanglement now additionally comprises the sphere of biosecurity and the promises of a distributed biotechnology available to everyone.

Keywords
DIYbio network, FBI WMDD, distributed biotechnology, bioterrorism, cultural construction of risks, technoscientific promises

Introduction

In 2012, one of us joined an evening of Kombucha brewing[1] at Sprout, a Boston-based (US) organization promoting citizen science (The Sprout Website 2014). Most of the field notes concerned the observer's inability to place one of the participants. He was tall and athletic, and his hair and beard were meticulously cut. His clothes, although a casual pair of jeans and a black T-shirt, were ironed and worn tight to his body. Altogether, he displayed a rather different look from the other participants, whose dress code consisted of frequently washed and large T-shirts with geek jokes; trousers worn long enough for them to take on the shape of the wearers' knees; uncombed hair and casual beards. It was only at the end of the workshop, while participants started to informally talk to each other that Mackenzie Cowell, DIYbio cofounder and one of the organizers, asked the participant in question who he was. He presented himself as a Federal Bureau of Investigation (FBI) field agent and handed him his business card. Cowell took it and joked about how they should put it under a safety glass to be broken in case of an accident.

Four years before the Kombucha workshop and the visit of the FBI agent, the first meeting of the DIYbio network took place in a pub near the Massachusetts Institute of Technology. Drawing on the analogy with the personal computer and other personalized technologies, DIYbio members envisioned biology and biotechnology as a creative and personal technology to be made available to everyone. As for other techno-libertarian utopias, they envisioned the practice of biology and biotechnology as an empowering activity contributing to the democratization of science and the fulfilment of individuals (Tocchetti 2012). The network is composed of self-proclaimed biohackers, amateur biologists, citizen scientists, and

garage biologists. A majority are current or drop-out graduate and postgraduate students—most of whom have participated in international Genetically Engineered Machine (iGEM) or other synthetic biology research programs[2]—but some are also disenfranchised researchers or professionals who see in this initiative the possibility of reviving their passion for science.

Hands-on activities include the making of cheap and user-friendly laboratory instruments suitable for exploratory genomics, microbiology, and genetic engineering, or the observation of microorganisms. The most common demonstrations include the extraction of DNA from fruits or buccal scrub samples using household ingredients, the genetic modification of bacteria or yeast, the identification of species or phenotype distributions by amplification of genetic polymorphisms, testing oneself or someone else for a gene, the use of gene sequencing and synthesizing services, the growth of bacterial and fungi biomaterials, and the preparation of fermented products.[3]

The opening scene epitomizes one of the several encounters with FBI agents that we experienced during our respective fieldwork. FBI agents circulated within and among the synthetic biology scientific community and the DIYbio network, and these incongruous encounters led us to question what the FBI was doing there. Listening to the FBI agents or DIYbio members, the answer was straightforward: the FBI and the DIYbio network collaborated to prevent biosecurity risks and to establish a safe network. Still, the discourses and practices advocated by DIYbio network make the presence of the FBI difficult to understand. On the one hand stands the widely distributed, nonhierarchical DIYbio network advocating a personal biology and biotechnology available to all. On the other hand, there is the FBI, a highly organized institutional police and intelligence force. In taking the collaboration between DIYbio members and FBI agents as a case study, we therefore ask: what problematization of risk, biosecurity,[4] and biotechnology allows the FBI and the DIYbio network to collaborate? What is at stake in this relationship, and how can we critically understand it? How does such collaboration reveal the political values of the DIYbio network?

The relevance of these questions was confirmed by their absence in the respective literature on the DIYbio and the FBI. The first scholars writing about the DIYbio network, racing to forecast future risks related to the field of synthetic biology, have argued that the activities of biohackers and DIYbio members were to be considered as a serious biosecurity issue (Schmidt 2008; Bennett et al. 2009). If biosecurity marks the analytical perspective of these scholars, successive academics focusing on the culture of the DIYbio

network have given little or no attention to the role of collaboration with FBI agents on the formation of the network itself. For Sophia Roosth (2010), the DIYbio network is an "*un*disciplined offspring" of synthetic biology (p. 113), a "mode of political action" claiming access to the practice of life sciences as a right rather than a privilege (p. 105), and the return of the biological as a crafted substance. Morgan Meyer (2012) understands the movement as producing creative work-arounds of tools that result in more permeable boundaries between professional scientists and amateurs, while Ana Delgado conceptualized DIYbio practices as things intended as gatherings (Delgado 2013). Lastly, Alessandro Delfanti (2013) argues that the ambiguous demands of its members exemplify a "remix" of the Mertonian norms and the computer hacker's ethic. Delfanti understands such "remix" as a symptom of the crisis of the proprietary regimes of biotechnology. He is also the only one who mentions that "DIYbio proved very capable of finding ways to position itself in order to avoid backlash and problems" by collaborating with the FBI or other authorities (2013, 129). On one hand, a subfield of literature on the DIYbio network thus tends to be rather alarmist with regard to the extent to which the activities of DIYbio members actually represent a biosecurity risk. On the other hand, the literature interested in the culture of the DIYbio network underplays the importance of the collaboration with the FBI.[5]

Similarly, the literature on the FBI is not very helpful in our case, as it does not provide an understanding of how the Bureau engages with actors regarding biosecurity risks. If intelligence and police services are now a common object of interest for science and technology studies scholars, this is mostly due to their adoption of forensic technologies and the administration of proof that they enable (Lynch et al. 2008; Aronson 2010), or because of their reliance upon scientific expertise in the assessment of biosecurity issues related to life science (Vogel 2013). Our work instead invites the reader to consider a case where the border between suspect and expert is not given in advance. It is a case where the FBI's practices of surveillance, policing, and collaboration are all used in relation to a network mostly composed of young and/or disenfranchised scientists. In this respect, the analyses proposed by social movement scholars are instructive in putting the history of the FBI into perspective (Cunningham and Noakes 2008; Marx 1974). However, the analytical insight of these works is limited when considering the "collaboration" between the FBI and the DIYbio network. This is because, as we will see, the members of the network were only initially perceived as a threat, which, counterintuitively, led them later to become informants.

This article thus focuses on what seems an understudied issue: the collaboration between DIYbio members and FBI agents. This collaboration's first root is the US government reframing of bioterrorism in the last decade, taking into account recent biotechnological developments and nonstate actors. Then comes the simultaneous establishment of a promissory socio-technical vision of a distributed biotechnology that could be enabled by increased access to information and tools via the Internet and that could be practiced by professional and amateurs alike. This was first promoted by researchers in the field of synthetic biology and later realized in the formation of the DIYbio network. As part of this process, the bioterrorist risk and the promise of a distributed technology became the two sides of the same "dual-use" discourse. Over the course of a few years, the FBI became the organization in charge of achieving the biosecurity mandate. As part of this mandate, the FBI established an outreach program that included gaining the trust of DIYbio members. FBI agents increasingly recognized that the members of the network they were in contact with were not a threat as it had appeared initially. Rather, DIYbio members acquired the status of experts and informants. Partially thanks to the opportunities that opened up for the DIYbio network, the presence of the FBI became progressively accepted. Although they might have grown without the recognition of the FBI, the DIYbio network thrives better with it. But since the only horizon that matters to the amateurs is their socio-technical project, the political significance of an alliance with a powerful police and intelligence institution such as the FBI is not collectively debated.

By tracing the establishment of this collaboration, our case study allows us to argue that the generative capacity of technoscientific promises (Borup et al. 2006) is also entangled with the cultural construction of biological risks. This productive entanglement is composed of the promise of a socio-technical vision that is first disseminated by a group of scientists and then realized in the formation of the DIYbio network. It is also enabled by the discourses of a bioterrorist threat that is first disseminated by governmental commissions and reports and then institutionalized through the establishment of the FBI Weapon of Mass Destruction Directorate (WMDD). Partially due to the collaboration between the FBI and the DIYbio network, the FBI's security apparatus is now an established component of the socio-technical vision and practices of the DIYbio network. At the same time, the socio-technical vision of a distributed biotechnology and its stumbling early experimentations are part of the FBI biosecurity apparatus.

To understand such entanglement, we draw on the concept of boundary object defined as "objects which both inhabit several intersecting

social worlds and satisfy the informational requirements of each of them'' (Star and Griesemer 1989, 393). The notion of ''boundary object,'' although expanded to discourses, practices, and sites, allows us to understand how the members of two distinct communities could collaborate while retaining their original individual allegiances. In the course of the collaboration, a trading zone was opened by the discourses of a distributed biotechnology and was more and more densely occupied by the two parties' interests. This trading zone relies on the entanglement of promises and risks and enables a relationship of opposing entities to collaborate. The FBI polices the technological promises of the DIYbio network, and in return the DIYbio network might engender externalities that the FBI polices. Thus, the bioterrorist risk ended up having a positive impact on the DIYbio network and its growth.

This enquiry covers the period from 2009 to 2012. It is based on a discourse analysis of various governmental reports and social media used by the members of the DIYbio network, videos of presentations by FBI special agents, fieldwork observations of meetings between FBI agents and DIYbio members at iGEM, Sprout in Boston and New York,[6] and transcripts from the two meetings co-organized by DIYbio members and FBI agents as made available by the participants. This material was complemented with an interview with consultant Robert Carlson and with eight targeted semi-structured open-ended interviews with DIYbio members who were actively involved in the collaboration with the FBI. If our fieldwork is dominated by the discourse of a ''collaborative'' FBI, access to a wide range of information was nonetheless limited by the reality of a secretive intelligence institution. For instance, we had been refused access to certain events (e.g., In New York). Nonetheless, after long negotiation, we were authorized to interview two FBI agents, under the scrutiny of an FBI agent from the Office of Public Affairs, respectively, Supervisory Special Agent Edward You and Special Agent Nathan Hilson.

This article first retraces the renewal of biosecurity concerns following 9/11 and its entanglement with the emergence of the socio-technical vision of a distributed biotechnology. Then, we present the new role of the FBI as part of this biosecurity apparatus and in particular the outreach project aimed at educating the DIYbio network about biosecurity risks. Finally, we describe the steps in the collaboration between the FBI and the DIYbio network: the DIYbio members' efforts to allay the authorities' suspicions, the establishment of a mutually beneficial relationship, and its maintenance despite some unspoken disagreements.

Policing and Celebrating the Proliferation of a Distributed Biotechnology

An important body of literature has described biotechnologies as marketed and globalized innovations, whose economy is sustained by hypes and promises (Cooper 2008; Rajan 2006; Joly 2010). Biotechnology development has also been considered in conjunction with warfare and national security politics (Balmer 2012). Since the Cold War, and even more in the 1990s and the 2000s, biological weapons had been a growing concern in both US and international institutions. First framed as part of the regulation of warfare programs, bioweapons were later also considered as potentially usable by terrorists (Guillemin 2005; Reppy 2003; Lentzos 2006). In these recent decades, in addition to state military programs, nonstate actors were progressively understood as being capable of handling bioweapons (Wright 2006). As the Cold War faded, the Soviet threat was replaced by projected threats of terrorism. This new type of threat was eventually exemplified by Aum Shinrikyo's sarin attack in Tokyo in 1995. The concerns raised by this event were intensified by following developments in new areas of the life sciences, such as, for instance, the synthesis of DNA from infectious agents (Zylberman 2013). Under the historically recurrent concept of dual-use technology, this research was increasingly understood to be promising for both the economy and public health yet threatening for US national security (McLeish and Nightingale 2007).

In the aftermath of 9/11, the US Administration's security concerns over biotechnology and biological research increased, in particular after the anthrax letters case. Different commissions charged with the evaluation of US security policies considered these insufficient and encouraged new regulation of life sciences intended to reinforce US biosecurity. Most of these regulations concerned the scientific community: access to biological agents, research funding, processes of scientific publication, and so on (Reppy 2003; Lentzos 2006; McLeish and Nightingale 2007). Among these issues, the proliferation of biotechnology and know-how on the Internet became a new risk that particularly attracted the attention of policy makers (Fink Committee 2004).

After 2001, the national security risk associated with biotechnology was framed as part of a "proliferation-terrorism nexus" (Ellis 2003, quoted in McLeish and Nightingale 2007, 1639). But at the very same time, the vision of a proliferating biotechnology was also at the core of an emerging field that would later be called synthetic biology. In October 2000, Robert Carlson, Drew Endy, and Roger Brent, three scientists based at the Molecular

Science Institute in Berkeley, coauthored an "Open Source Biology" proposal to the Defense Advanced Research Project Agency (DARPA). In their funding request, they argued that "the Open Source Biology community will rely on individuals and small groups of people to take charge of [...] maintaining and improving the common technology, open to all, usable by all, modifiable by all" (Carlson and Brent 2000, 1). Central to the project of an Open Source Biology is the idea of a distributed biotechnology that could be enabled by increased access to information and tools via the Internet and that could be practiced by professional and amateurs alike. As this socio-technical vision was advocated in the political context described in the previous paragraphs, Carlson remembered:

> September 11th came, and the anthrax attacks, and the US went temporarily insane about security (...) we started to see people, government agencies and individuals speaking louder and saying 'this behavior is abnormal and we're going to crack down, it's a security threat, it's a threat, etc.' (...) It seemed pretty clear that the cost of these policy decisions were much greater than their benefits.[7]

Preoccupied that his socio-technical vision might be in danger, Carlson made various efforts to approach members of the Washington, DC, security community. He published several articles in biodefense journals and disseminated his message at strategic conferences.[8] In his opinion, the proliferation of biotechnology should not only have been considered as a threat but also to have economic potential. He promoted a socio-technical vision where biotechnology is generally "de-skilled and less expensive" (Carlson 2012, XIII). Carlson also envisioned a specific organization of the scientific community, described as a "distributed network" of innovators (2012, 19), entrepreneurs, and amateurs, inspired by the open-source software movement. This conception is part of a larger neoliberal theory of the natural and political world advocated by Carlson. He considered that "natural innovation" (of a "paleobiotic" era) and bioengineering (of the "neobiotic" era) only differ by being governed by different laws: natural evolution reigns on "natural innovation," while the economy and market forces govern biotechnological innovation (Carlson 2007). Consequently, he strongly opposed "the false promises of regulation." Government-led centralized regulation is presented as unable to address security issues without undermining the economic potential of the technology. He suggestively claimed that "our best potential defense against biological threats is to create and maintain open networks of researchers at every level, thereby magnifying

the number of eyes and ears keeping track of what is going on in the world'' (Carlson 2003, 10).

Even before the creation of the DIYbio network in 2008, Carlson aimed to mitigate any suspicions regarding the Open Biology project and the amateur community he envisioned. To gain credibility with the security community, he proceeded to circulate as a network entrepreneur (Turner 2008) among, and establish relationships between, diverse communities (i.e., biosecurity communities, entrepreneurs, and biohackers) that were previously unrelated. As a result, Carlson gained legitimacy in policy circles and recently became a consultant for the Department of Homeland Security: ''It took a few years, but eventually I succeeded in convincing people [the security administration] to do things differently.'' By doing so, Carlson framed and disseminated a specific conception of how the proliferation of biotechnology should be regulated. Through these interventions, he contributed to reinforcing the entanglement of risks and promises.

A Story of an Encounter: The New FBI and a DIYbio at Risk

At the same time that Carlson was disseminating his vision of what a security model for distributed biotechnology should be, new governmental institutions were formed that were dedicated to addressing biosecurity concerns in relation to the life sciences. In 2006, the FBI WMDD was created and obtained the status of lead agency in bioterrorism matters (Majidi 2007). The WMDD is a pyramidical organization with police powers and an intelligence mandate. National headquarters is in charge of establishing the Bioterrorism Prevention Program, while fifty-six field offices nationwide serve as local points of contact. The Supervisory Special Agent Edward You works at WMDD headquarters on developing the Synthetic Biology Outreach Program (SBOP). The program aims to ''secure synthetic biology'' and to ''sympathize communities to the threat.''[9] Under the SBOP, FBI agents came to engage with members of the scientific community, including students participating in the iGEM competition, the gene synthesis industries, and members of the DIYbio network.

During the time that the FBI was restructured, to promote their sociotechnical vision, the early members of the DIYbio network used social media extensively, participated in numerous public events, and set up collaboration with universities, educational charities, and science outreach initiatives. In particular, between 2008 and 2010, their proactive relations with journalists resulted in coverage that was swift, intense, and marked

by sensationalism. Exploiting the weak analogy between computers and biological viruses, commentators warned against the hypothetical release of "biospams" (Schmidt 2008). Others mobilized the supposed fear of the public about genetically modified organisms as Frankenstein's monsters (Ayres 2008; Whalen 2009) and spread the opinion that biohackers could inspire bioterrorists (Ayres 2008), be a threat to national security (Whalen 2009), release synthetic viruses (Whalen 2009; The Economist 2009), or create mutant viruses (Zimmer 2012).

Moreover, media coverage was characterized by a familiar and polarized discourse—technological revolution, unavoidable apocalypse—that is often used to portray technoscience (Haraway 1997). Much like post-9/11, when distributed biotechnology was framed as dual use by the governmental commissions, the media disseminated a representation of the DIYbio network as a "dual-use" entity. This meant that its members' activities should be understood both as revolutionary and as extremely dangerous. The enthusiasm of DIYbio members was thus balanced by the only criticism proposed by the media that DIYbio was a biosecurity concern. As these media articles were frequently discussed on DIYbio mailing lists and local groups, members became increasingly concerned about how their activities were perceived not only by the media but also by the authorities. In these discussions, the Steve Kurtz case became a constant reference to what repression of their activities could look like. The case refers to the 2004 arrest of the critical artist Steve Kurtz by the FBI Joint Terrorism Task Force (Sholette 2005). Over the course of four years, Kurtz was prosecuted for bioterrorism for keeping harmless bacteria in his home; however, the charge for bioterrorism was eventually dropped. Kurtz became an iconic example of the repressive methods of the FBI and a member of the network even turned the artist's name into a symbolic verb: to be "Steve Kurtzed" (Biopunk Website 2008).

To overcome the mistrust of the members of DIYbio network (among others), the FBI built a narrative of an "old FBI" and a "new FBI." As Agent You puts it, "now, it's not just going in with the alarm blazing, blocking up the entire neighbourhood, and coming with gasmask suits, but it's having a commensurate response to it."[10] This more commensurate and participative approach to amateur network was carried out by Agent You at numerous events of the synthetic biology and DIYbio communities. At these occasions, he disseminated the public image of the new FBI. In particular, Agent You and his PowerPoint presentations became the face of the outreach program. To make strategic actors feel comfortable having the FBI WMDD coordinator on their "speed dial," Edward You reassured them

Figure 1. On the left are the slides that Agent Edward You used to present what the FBI "is not." On the right are images of what "it is." Agent Edward You and colleagues at Genetically Engineered Machine. The lower right image shows Agent Edward You at the Outlaw Biology public conference organized by the University of California, Los Angeles (UCLA) Center for Society and Genetics in 2010.

that, despite the institutional history of the FBI, the response would be commensurate, in other words, that they would be recognized as informants and not as threats. He sometimes joked about how Hollywood has not done the FBI many favors, referring to TV shows such as The X-Files (see Figure 1).

Through his PowerPoint, You also disseminated a specific idea of the biosecurity risks about which the FBI is there to educate attendees. While he only presented the literal content of the slides, it was through their sequence that a type of biosecurity risk is constructed: Al-Qaeda's alleged interest in bioweapons, the 2008 Puffer Fish Case,[11] and the case of a journalist who successfully bought a DNA fragment of smallpox. Edward You's collage persuasively presented a biosecurity threat solely attributable to nonstate actors, international "terrorist organizations," and domestic criminals. The increased accessibility of synthetic DNA, as demonstrated by the case of the journalist, was used to raise the specter of decentralized networks of terrorists and anonymous individuals.

Figure 2. Slides from the presentation Agent Edward You gave at the Woodrow Wilson Center in March 2010.

Since informants are a central resource for intelligence work (Weiner 2012), when addressing the synthetic biology and DIYbio communities, Edward You concluded by stressing the importance of everyone's participation (see Figure 2):

> We heavily rely upon you, you are the subject matter experts, you help us by understanding what the threat really is [. . .] it has to come from the community to advise us, to inform us, to help us do our job better protecting everyone.[12]

In order to adapt to such a multilevel threat, the FBI itself has to develop a decentralized network of informants below the institutional level: the "neighborhood watch" strategy based on volunteer participation is in this case extended to biosecurity. In the following months, the members of the DIYbio network were progressively invited to take part in the "neighborhood" of the new FBI. The FBI promoted its current security-intelligence system as an improved version based on a "proactive rather than reactive" and "engaging" rather than repressive approach. Such a system felt similar to a larger participatory turn characteristic of the post-9/11 national security apparatus.[13]

Networking Trust: Deflating the Hype and Dissipating Mutual Suspicions

In August 2009, the FBI invited several "stakeholders" from the DIYbio network to attend the first event of the SBOP. At this occasion, Jason Bobe, the cofounder of DIYbio, presented a first overview of the network to government officials, professionals, and members of the scientific community.

His aim was to put the hype into perspective. In particular, he clarified that despite what the media suggested, no known member of DIYbio was doing anything close to synthetic biology.[14] He also stressed that most of the activities undertaken by DIYbio members were the same as those required for any preparatory class in biology.[15] Bobe's effort to deflate the hype was consistent with other DIYbio members' impression that if the event was not hostile, it was at least marked by an inquisitive atmosphere.

Three months later, at the iGEM competition, DIYbio members and FBI WMDD special agents bumped into each other again. This was the DIYbio members' first informal but international meeting.[16] Commenting on the event, Ellen Jorgensen, a founding member of a DIYbio network based in New York, cautiously expressed:

> At first I was very wary. But I was impressed with Ed You and his willingness to reach out to DIYbio [. . .] If we were to thrive in post-9/11 New York, we had better be proactive in reaching out to the FBI. (Lempinen 2011)

Jorgensen indicated that, for her, engaging with the FBI was not an option but a necessity. More generally, early members of the DIYbio network did not reject the presence of the FBI but acknowledged it with intrigued suspicion.

Between 2008 and 2010, the DIYbio network grew, with regional groups formed in Boston, New York, San Francisco, Los Angeles, and shortly afterward in several European cities. Meanwhile, between 2009 and 2012, more than twenty occasions brought FBI agents and DIYbio members together. Initially, these events were rather formal, such as the three outreach conferences organized by the FBI to which DIYbio members were invited. Others were organized by third-party institutions to explicitly facilitate their meeting, such as those by the Woodrow Wilson Center and the University of California, Los Angeles Center for Society and Genetics. At these occasions, members of the DIYbio network would present an overview of their projects, while Agent Edward You, in his role as the spokesperson of the outreach program, would present his usual PowerPoint.

The meetings progressively moved from the neutral space of conferences to DIYbio regional events and community laboratories. The most advanced DIYbio groups, like Genespace in New York, Biocurious in the Silicon Valley, BOSSlab in Boston, and SoCal in Los Angeles, started to host local events to which FBI headquarter's agents and liaison officers were invited. These consisted mainly of informal laboratory tours, but sometimes FBI agents also turned up spontaneously at weekly events. Daniel Grushkin, founding member of Genespace, recalled:

> Bringing the Agents to the labs deflated all the hype [. . .] for them it was fun, a day off and they had a lot of fun, I didn't have the impression they were questioning anything, a lot of them turned out to be big science geeks.[17]

Members of the DIYbio network were also invited to at least two training workshops organized primarily for new FBI WMDD agents and other biosecurity professionals. At this occasion, they were again asked to present what a "community laboratory" looked like.[18] Subsequently, both Genspace and Biocurious' members sent pictures of their laboratories to the FBI and participated in the production of a pamphlet aimed at educating agents on how to distinguish a "community laboratory" from a "meth lab."[19]

On several occasions, FBI agents claimed to share the values of the amateur biologists: "we're here to support science. We're here to make sure that the feelings of amateur biology are met, and we're here to assist in that."[20] This support also implies the reconfiguration of DIYbio member's distrust. At the event co-organized by DIYbio members and the FBI and hosted by Genspace in New York, an FBI agent said,

> [DIYbio members] might think that this is all a huge conspiracy (. . .) and that the FBI is here to hack into the community. The concern should be instead about articles like this (. . .) 'Amateurs are the new fear to create mutant viruses.'

This excerpt suggests that to create the conditions for collaboration, agents needed to persuade DIYbio members that the threat to the development of an amateur biology wasn't the FBI policing but rather media sensationalism or public opinion. The narrative of collaboration became part of the relationship. As one of FBI liaison officers expressed, "I would not say that I know the DIYbio community, I'd rather say I'm part of the DIYbio community [. . .] we were brewing beer last week."[21]

The relationship between FBI agents and members of the network became progressively stronger and meetings more frequent: their funding increased, more actors were invited, and more activities were proposed. By moving from formal to informal meetings and opening the doors of their community labs, the DIYbio members were able to clear themselves of the initial suspicion and instead acquire an informant-expert role. In July 2011, a first FBI-DIYbio outreach workshop was co-organized by Genspace's founders and the New York liaison officers, followed by a second one hosted by Biocurious in June 2012. In 2011, participants came

from several US locations; however, the outreach scope of the second workshop was extended to international members of the network. Altogether, more than 120 people were invited, including, for the second workshop, pairs of DIYbio "delegates" from seven European countries, Turkey, Canada, Indonesia, and Singapore. In both cases, the FBI WMDD covered the travel and accommodation expenses of every participant.

At the second workshop, Assistant Special Agent Craig Fair welcomed everyone, reemphasizing that "We do not recognize the amateur biology community as a threat in any way. We view you as partners." He added that,

> This community should also be protected from nefarious actors, and the community must be a first-line defense against these actors, and the WMDD coordinators can work with the community to deal with these people.[22]

A cheerful detail contributing to this welcoming atmosphere was the "Safeguarding Science" deck of cards (see Figure 3). This game, based on the Biological Select Agents list,[23] was presented by Agent Fair as a tailored outreach tool "to educate more about good/bad bacteria and viruses." Shortly afterward, a DIYbio member commented on his blog:

> I must say; it was pretty cool getting these cards from the FBI/DOD [Department of Defense]. It went a long way towards making all of us feel a bit more relaxed about being there! (Synbiota Website 2012).

Figure 3. Picture of the Federal Bureau of Investigation Biosecurity Outreach Cards.

Despite a participant complaining on his blog, "Enough with the safety stuff, let's get to the real business!"[24] the program was clearly negotiated to suit the interests of both parties. If plenty of time was in fact left for DIYbio members to talk formally and informally about their work, a significant amount of time was also dedicated to biosecurity-related issues. This is particularly explicit in the organization of the discussion with laboratory suppliers about the access to DNA synthesis services, the workshop aimed at training DIYbio members to deal with journalist requests and interviews, and the tabletop exercises about emergency situations.

Professionals from the DNA synthesis industry were invited to present the protocols in use for the verification of synthetic DNA orders. During this session, DIYbio members acquired practical information on how to signal the legitimacy of their orders.[25] At the same time, by learning how members of the DIYbio used or might use the services of DNA synthesis, the WMDD FBI agents also learned about types of orders that otherwise might have missed. The workshop on "How to speak with the media" was jointly organized by two members of the DIYbio network who are media professionals and, Julie Sohn, a spokesperson for the FBI. The purpose was to discuss in practical terms how to administer the relationship with journalists in order to minimize alarmist news reports. The transcripts of the workshop suggest that DIYbio members were eager to acquire skills to disseminate their socio-technical vision while minimizing distortion by the media. The FBI agents encouraged DIYbio members to mention their cooperation with law enforcement in their public discourse, suggesting that it would help ease sensationalist coverage. During the emergency scenario exercises, the participants were asked to react to different fictional situations proposed by the FBI. Among these, two specific cases were explored: DIYbio liabilities (i.e., parents claiming that their child got food poisoning after participating in a DIYbio hands-on workshop) and the use of their laboratories for suspicious activities (i.e., a member who has recently returned from Asia with strong political opinions is looking for harmful chemicals in the laboratory). These workshops and exercises helped DIYbio members to consider issues that could threaten the growth of their network. By designing the tabletop case studies in this way, the FBI agents both raised awareness about specific types of risk and gathered reactions and suggestions from the participants regarding their plausibility.

Finally, when asked about what it meant for them to participate in such an event, the first answer from the majority of the DIYbio interviewees was to express how great it was to finally meet other members with whom they had previously only had e-mail contact. Secondly, they mentioned that they

could not have afforded the costs themselves and that therefore the offer was very attractive.

The trust between the FBI and the DIYbio community was built through three major phases: formal, informal, and collaborative. In the last stage, the DIYbio and the FBI became partners in the co-organization of outreach events. On these occasions, the distinct yet related interests of the two actors were negotiated. By financing the logistics of these national and international meetings, the FBI enabled the DIYbio network to expand from its virtual (online) presence to off-line meetings, therefore making possible a formative moment that is fundamental for many online networks (Coleman 2010). In return, by enabling the national and international gathering of the DIYbio network, the FBI built trust and gained access to information.

Unspoken Disagreements Do Not Jeopardize Opportunities

According to our interviews, the majority of the DIYbio members who participated in these events believed that working with the FBI gave additional legitimacy to their group. They stated that when feeling threatened by journalists' questions they mentioned the collaboration with the FBI as a sort of clearance and they encouraged other members to do so. Others argued that working with the FBI was simply part of their culture of openness, a commitment to full disclosure. Thomas Landrain, the cofounder of La Paillasse in Paris and supporter of this argument, explained:

> For me, the question of transparency is present. When we start hiding something, it means that there is a problem. No, we are aiming to practice a biology open and free you see. [. . .] We are not going to limit ourselves to some type of interactions because the others are cops or policemen. I find this stupid.[26]

Few European members[27] expressed a different opinion regarding the legitimacy of the collaboration with the FBI. Among them was Rüdiger Trojok, a member from Germany. He concluded his presentation by telling the story of his grandfather, who fled the German Democratic Republic because he publicly criticized communism. When interviewed he further explained:

> In general I think an intelligence agency should not have any executive powers, in Germany we have enough experience with intelligence people running wild and it was never to the good [. . .] if I would start reporting people who

> work late at night in the lab, 80% of all German researchers would be potential terrorists.[28]

He also said that DIYbio members based in the United States did not understand his comments, while he felt that the Europeans downplayed them. During the laboratory visit at Biocurious, he had an informal discussion with a couple of FBI agents. They asked him if he was a communist, did drugs (especially genetically manipulated marijuana), or had any problem with foreigners. He was unsettled by their questions. Another European participant was also surprised that these issues raised such little collective discussion.[29]

This story suggests that the collaboration with the FBI is incompatible with mistrust or political critique. The questions asked by FBI agents to Trojok also highlight that bioterror is not the only threat that is policed by the Bureau. The FBI's interest in communism or drug use illustrates that historical "threats" (i.e., communism, marijuana, and radical right movements) are still very much at the center of police interest and thus reveals the ongoing reactionary ideology of the Bureau. Because most of DIYbio members agreed on the notion of bioterrorist risk formulated by the FBI, they contributed to its dissemination and legitimacy. At the same time, this notion of bioterrorist risk also allowed the Bureau to police traditional threats.

Finally, the extent to which DIYbio members agree with the definition of risk disseminated by the FBI as well as the extent to which secure practices become habits is very much open to debate. Most of the DIYbio members we spoke to considered the type of threats that the FBI agents informed them about as plausible, if not necessarily real. A minority expressed a certain level of skepticism concerning the magnitude of the concern. When asked how they would use the contact number of an FBI agent, Grushkin, for example answered that,

> The reason why we carry them is not the obvious reason, is not because if we see something suspicious we will call the FBI, [. . .] if there is a fire and local police department was suspicious of what was going on in the space we could call the FBI and they would explain to them what exactly this space is.

Despite the investment from the FBI, it is difficult to trace how the model developed in the United States is actually informing the practices of the members of the DIYbio network. Nonetheless, the FBI is promoting this model to the international community. As Special Agent Fair declared in 2012:

> We also want to show the international community that this model is safeguarding your practice, and that's to our mutual benefit. This model works.[30]

Yet, while the scope of the outreach program is difficult to evaluate, the alignment of the DIYbio network with the FBI's new security apparatus seems solid. The biosecurity apparatus has expanded from the sphere of state, military, and corporations to reach out to individuals and nonstate actors (i.e., graduate and postgraduate students, dropouts, members of the civil society, and disenfranchised scientists). For this unexpected collaboration to endure, the FBI and the DIYbio needed several years of adjustment. After the first meetings, DIYbio members succeeded in transforming the biosecurity risk they were associated with into a number of practical opportunities, using the FBI as a means to thrive. Negotiating agendas with powerful institutions became an additional skill acquired by the members of the DIYbio network. These meetings served not only as a mean of interaction with other members and of learning about their projects, they also offered privileged access to professionals in the DNA synthesis industry, expertise on how to administer the relationship with the media, and an opportunity to take part in emergency scenario exercises. The FBI is now also understood to be an effective resource they can rely upon if their activities are misunderstood by public servants such as local police or firefighters. A mutual trust seems to have been successfully negotiated, even though the case of Trojok illustrates that a friendly agent is not an inattentive agent and that trust toward the organization does not impede mistrust toward any of its members. Nonetheless, even if not everyone recognizes the legitimacy of the FBI as a partner, the question of the political posture of the network toward the Bureau is never collectively discussed. Carlson's warnings against the danger of regulation, and his alternative framework embodied in the DIYbio network, have become a model with which to secure the promises of a distributed biotechnology. By helping to establish such an "open network," the FBI has woven a tripwire into it, and the DIYbio members have learned both how not to fall into it and how to use it as a resource. The tripwire defines the limits of a territory: inside is the "safe DIYbio" and outside is an unknown space to be policed where putative "nefarious actors" can still exist. The space of the possible threat is progressively defined by clearing suspects from that risk and turning them into collaborators.

Conclusion and Discussion

The aim of this article was to understand which problematization of risk and biotechnology facilitates the collaboration between the FBI and the DIYbio network. Reflecting upon this problematization means to ask simple questions about what counts as an important problem and what count as an acceptable solution?

We argue that for the FBI the major problem was to find a network of nonstate actors whose members could acquire bioweapon capabilities. This is a problem to be understood in the context of the political importance that biosecurity was gaining after 9/11. For the DIYbio network, the problem was media sensationalism and what they perceived as public distrust. Even if DIYbio members were very proactive in the way in which they collaborated with the media, the frequent conflation of their sociotechnical vision with biosecurity or biosafety threats was an important obstacle. The acceptable solution for the FBI was to find a network of nonstate actors whose members could be turned into informants who could gather valuable information in the event that a truly menacing network might develop. The acceptable solution for the DIYbio network was to collaborate with the Bureau in order to dissociate their sociotechnological vision from that of might-be bioterrorists. The relationship could have been interrupted once the DIYbio had been dissociated from being conceived as a bioterrorist threat. It has nevertheless continued for many years up to the present day because, for each of the two entities, the collaboration might still be useful. This is not to say that the FBI and the DIYbio networks are entities that can be considered equally powerful, nor that this relationship affects them in the same way. By policing the DIYbio network since its infancy, the FBI with its security message has succeeded in becoming a formative element of the network.

The promise of a distributed biotechnology entangled with a bioterrorist risk opened a trading zone. Within its boundaries, the collaboration between FBI agents and DIYbio members became possible. The trading zone has its own geography composed of sporadic events and stable locations (i.e., conferences, workshops, and community laboratories). Within this trading zone, the elements of the collaboration circulated. These were *objects* such as the pictures of communities that laboratories sent to the FBI, and the deck of playing cards or the business cards of the agents; *local practices* such as the Kombucha workshop and DNA extraction from strawberries, scenario planning, the simulation of orders to DNA synthesis industry, and the discussion on how to speak with the media. Although

these elements can be broadly considered as boundary objects, we argue that the trading zone is dominated by *discourses*: the promise of a distributed biotechnology, biosecurity risk embodied in nonstate actors, and an ideal of regulation described as an open network. The dominance of these discourses reflects their performative power. There is no actual object or practice solid enough to realize the technological revolution and the bioterror apocalypse on which the collaboration relies. Yet these discourses allow two distinct communities to collaborate, while its members retain individual allegiances to their field of origin. The DIYbio network represents the promise of a distributed biotechnology to be secured, while the FBI secures a distributed biotechnology to be developed. The DIYbio network performs as a laboratory where the FBI can continue to elaborate a notion of bioterrorism based on the promise of a distributed biotechnology, while the process of making the DIYbio network secure actually helps it to disseminate its socio-technical vision.

We have argued that the changes in the practices of the DIYbio network are open to debate, yet this collaboration between the FBI and DIYbio is nonetheless instructive in understanding the political values of the network. The WMDD has succeeded in becoming an acceptable collaborator, to the extent that DIYbio members seem more preoccupied by press coverage, public opinion, or other public authorities. The FBI has managed to recode the networks' quest for political autonomy and self-regulation. The members of the DIYbio network perceive the constraint of regulation only if it concerns health and safety or environmental issues. Instead, policing is generally not considered as a form of control, as it does not interfere with their socio-technological vision. If members of the DIYbio network at first dreaded being repressed by the FBI, they later became open to help by taking a role as expert-informant. For some members, the ideal of openness and transparency as inspired by computer hacker communities was comfortably extended to the collaboration with the FBI. The vision of an "open network" (and its related communication technologies) also functions as a boundary object. It structures a supposedly alternative mode of working with biology and biotechnology, and it allows members to collaborate with any social actor regardless of their political allegiance. Being an "open network" can mean, according to our interviews, both for some members to work at the margin of existing structures of power (i.e., institutional science) and for others to collaborate with the FBI. The openness of the DIYbio network is marked by a form of political relativism whose multiple facets well suit the epistemological characteristics of a boundary object. The values of this ally are not

a concern, as long as the relationship bears benefits for the members of the network. Even if some individuals disagree, the adaptive structure of the network is not in danger and its collective politics remain open to all forms of collaboration.

Once the vision of DIYbio is dissociated from a bioterrorist threat, its development is considered legitimate. The narrow framing of threats as a matter of national security reinforces the lack of attention of public authorities to the socioeconomical and ecological impact of what are now understood as legitimate distributed biotechnologies. As promises and risks are deeply entangled, by reaching out to the DIYbio network, the FBI ends up securing a techno-libertarian utopia and the promise of economic wealth bound to it. Counterintuitively, by policing biotechnology, the FBI is drawn into securing the promise of economic wealth to be set in motion by a distributed, open-access biotechnology, thereby participating in what Ulrich Beck (1992) has called an organized irresponsibility.

As the SBOP also has a mandate to secure the broader scientific enterprise of synthetic biology, including industrial and professional scientific communities, members of the DIYbio network have succeeded in gaining a place among established and influential actors. Thus, the now legitimate socio-technical vision of the DIYbio network can benefit from private investment and public funding, part of which comes from military research grants. For instance, in the aftermath of our fieldwork, the "Open Bioreactor"[31] project has received support from the DARPA.

Shedding some light on the relationship between the FBI and the DIYbio network opens questions about how technoscience promises and biosecurity risk set in motion research agendas, government priorities, and the creation of new markets. At the same time, this relationship masks urgent issues. One is that civilian and military research in biodefense is dramatically increasing (Reppy 2003; McLeish and Nightingale 2007). In this context, the work of the WMDD suggests that the American government ensures national security by policing practitioners while funding military research programs. Another urgent issue is that the political concerns arising from the formation of the DIYbio network are reduced to a biosecurity risk. For instance, the trivialization of genetic engineering and its cultural and environmental consequences are rarely debated. Finally, the masking of these issues is an additional trait of the DIYbio network. Its members claim to promote a more democratic practice of biology and biotechnology, yet their projects become just another strategic site where national and corporate technological interests are secured.

Acknowledgments

We are grateful to Alessandro Delfanti and Johan Söderberg for including this article in their edited collection and organizing the panel where we first presented this work. Many thanks to Olivier Borraz for his early yet insightful comments as well as the three anonymous reviewers and *ST&HV* editors for their suggestions and generous feedback. For her proofreading, we thank Sally Haywill. Lastly, we would like to thank the participants to this research for their own time and contribution.

Authors' Note

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Notes

1. Kombucha is a drink prepared by fermenting tea using a symbiotic colony of yeast and bacteria.
2. Synthetic biology is a recent life science field that aims to combine molecular biology with an engineering approach to manipulate cellular system for productive ends (Cameron, Bashor, and Collins 2014). Since 2005, synthetic biology has its own undergraduate competition, the international Genetically Engineered Machine (iGEM) competition, which is organized each year at Massachusetts Institute of Technology (Angeli Aguiton 2010). The organizers also encourage students' creativity and entrepreneurial spirit: from desertification to dental cavities, at iGEM each problem has its genetic solution. For an analysis of the relationship between the synthetic biology community and the DIYbio network, see Roosth (2010) and Tocchetti (2014).
3. The majority of these activities are not new: they are commonly proposed by professionals during science communication initiatives, educational curricula, or form a part of resurgent practices of artisanal food preparation (Paxson 2012).
4. Drawing on Collier, Lakoff, and Rabinow (2004, 3), this article considers biosecurity as "the genealogies, imaginaries and emergent articulations of biological weapons and biodefence." Our use of the concept of biosecurity covers

institutional areas of intervention, specific framing of risks, and of a national security agenda regarding such risks. As Susan Wright (2006, 57) reminds, "key terms, such as 'weapons of mass destruction,' 'biological weapon,' and 'terrorism' itself, are contingent, shaped under specific historical and political circumstances, and are therefore more fluid than often thought."

5. This is a recurrent pattern, similar to the absence of studies of military science (in proportion to their budget) in the science and technology studies literature (Woodhouse et al. 2002; Rappert, Balmer, and Stone 2008).
6. This fieldwork lasted two days in 2009, two days in 2011, and one night in 2012.
7. Interview with Robert Carlson, March 8, 2013. When not specified, the following quotes are extracted from this interview.
8. Such as conferences in the Center for Biosecurity of UPMC Center for Health and Security in Washington, DC, on March 2011, in Geneva for the Meeting of States Parties for the Biological Weapons Convention in 2010 and in 2011, and for the Bio-era H5N1 Executive Round Table in 2006.
9. Interview with Special Agent Edward You, July 10, 2012.
10. Interview with Special Agent Edward You, July 10, 2012.
11. In 2008, a man plotted to kill his wife using puffer fish toxin (CBS News 2011).
12. Talk given at the Woodrow Wilson Center for Scholars on March 11, 2010.
13. In 2010, the Department of Homeland Security launched the national campaigns "Citizen Corps, Stop, Think Connect" (for cybersecurity) and "If You See Something, Say Something," which all rely on the cooperation of the American public in the fight against terror (Reeves 2012).
14. Interview, July 10, 2012.
15. USA High School preparatory year in Biology.
16. A majority of early and current members of the DIYbio network participated in the iGEM (Angeli Aguiton 2010).
17. Interview with Daniel Grushkin, August 13, 2012.
18. See Note 17.
19. A "meth lab" is a colloquial term referring at the manufacturing of methamphetamine in illegal laboratories.
20. This quote and following are from the transcripts of the 2012 San Francisco meeting. Accessed June 12, 2013. http://diyhpl.us/wiki/transcripts/fbi-diybio-2012/intro.txt.
21. Expression Statement used by a Federal Bureau of Investigation (FBI) agent at the SynBERC retreat, September 26, 2011.
22. Transcripts from the meeting. Accessed September 19, 2012. http://diyhpl.us/wiki/transcripts/fbi-diybio-2012/.
23. The Select Agents and Toxins List aimed to regulate the risks of laboratory pathogens for publicly funded research.

24. Pieter van Boheemen Website (2012)
25. As part of the Synthetic Biology Outreach Program, the FBI Weapon of Mass Destruction Directorate has also reached out the DNA synthesis industry in order to similarly secure synthetic DNA markets.
26. Interview with Special Agent Edward You, July 16, 2012.
27. If we consider the DIYbio as a network, paying little attention to the comparison of national particularities regarding US and European groups, it is because the community of amateur biologists can still be understood as marked by what Traweek (1988) has called the "culture of no culture," a type of culture under which nationalism is not acknowledged as a trait (p. 162).
28. Interview with Rüdiger Trojok, August 10, 2012.
29. Written interview Lisa Talheim, September 2012.
30. From the meeting transcripts. Accessed February 22, 2013. http://diyhpl.us/cgit/diyhpluswiki/tree/transcripts/fbi-diybio-2012/.
31. "A bioreactor is a device which supports a biologically active environment." Accessed November 2, 2014. http://www.openbioreacteurs.org/.

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