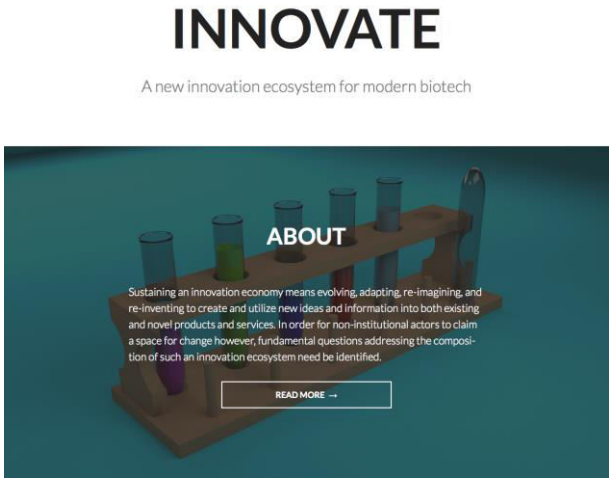
Innovation Ecosystems in Genomics and Biology

By Eleonore Pauwels[i]

What is the future of biotechnology? How can we create an ecosystem that integrates traditional and non-traditional actors and bolsters innovation? With the rise in do-it-yourself biology (DIY) and citizen science, how do we ensure that individuals are abiding by moral and ethical standards? Are the moral and ethical standards even tangible in such a complex, and multifaceted field?



These were just some of the questions that were discussed in a two day workshop, "Innovation Ecosystems in Genomics and Biology" on September 22nd and 23rd, hosted by The Woodrow Wilson International Center for Scholars and The Institute for the Future. The main objective of the workshop was to bring experts and leaders from an array of government, university, and private institutions to examine the current biotechnology environment and forecast the factors that will allow the biotechnology innovation ecosystem to cultivate and ultimately become sustainable in the future.

Startups driving innovation

The timing of this workshop is in line with a major transformation we are seeing in the landscape of biotechnology. More and more research and innovation is being driven by individual entrepreneurs and startup companies as opposed to large biotech corporations and universities. While this provides an opportunity for individuals to become involved in the scientific community and work to solve some of society's multidimensional problems, there needs to be a greater understanding of what an innovation ecosystem consists of, its ethical implications, and its ultimate impact on economic growth.

Eleonore Pauwels of the Wilson Center and Eri Gentry of the Institute for the Future hosted a discussion that featured over fifty participants who represented members of traditional and non-traditional companies, government agencies, university faculty, and Silicon Valley. These participants provided their input on the catalysts used to drive innovation, the strategies which can be implemented, and the research and development behind innovation.

Towards a cloud-based system

One of the problems they saw with the current biotechnology ecosystem is the "decentralized system of actors." This is because of the lack of cohesion they are seeing between individual scientists, small start-up companies, government agencies,

universities, and Silicon Valley. However, the visions that they shared prove that they are optimistic and hopeful of the creation of a sustainable bio-economy. The participants believed that this can be achieved if biology is accessible to everyone through a cloud-based system that allows individuals to share and analyze data, if the gap between Silicon Valley and Washington, D.C. is bridged, and if the youth are more educated on the values associated with innovation.

In terms of making biology more accessible, the participants wish to see the development of a cloud/virtual space to allow researchers from a multitude of disciplines work together and connect on an emotional and intellectual level. By having a centralized system that permits scientists to share and analyze data with each other, researchers will have the opportunity to continually build on new and old ideas. The participants wish to see data not only from successful experiments but also from failed experiments. This can, in the long run, create an environment that drives improvement. In addition, they believe that laboratory space is one of the biggest driving factors to potentially change the paradigm of biotechnology innovation. Researchers who can save money by renting out space and equipment are much more likely to pursue their innovation projects. This is evident in companies that already exist such as Harlem Biospace and Fab Labs DC. On that note, the participants hope to see a growth in biotechnology laboratory hotspots in major cities in an effort to meet the demands of scientists.

A DIFFERENT TYPE OF LAB ENVIRONMENT

Investing in disruption

Another huge focus of the workshop revolved around the relationship between Silicon Valley, universities, policymakers, and biotech incubators. The participants argued that it is becoming harder to become funded by companies in Silicon Valley. They claim that these large companies fail to invest in projects that have a deep impact in society. They wish to see more companies such as DFJ, which invests in biotech companies, to promote and encourage disruption. In addition, they want to see investors enter the field of academia and encourage students to pursue innovation instead of publications.

Tom Burkett, of the Baltimore Underground Science Space, believed that universities should not emphasize students to pursue graduate degrees over starting their own research projects. Participants agreed that the youth need to be more educated about the importance and role biotechnology plays in society. The more the universities give ownership of patents to students, the more the students will feel a sense of pride. This may ultimately sway them to pursue their own innovative projects rather than writing a publication. Ross Dakin, a Presidential Innovation Fellow at the White House, maintained that we need to incentivize students to pursue innovative projects. Incentives that we can use are recognition, employment, education, and the opportunity to serve humanity.

What is responsible science?

However, despite these visions, there are a range of obstacles associated with the shift in paradigm that need to be overcome first. The overarching challenge is to determine what responsible science is. Adam Cox from the Center for Strategic and International Studies argued that we need to know how to deal with scientists who have not been trained in bioethics or those who create technologies that have unintended consequences. Furthermore, he asks whether individuals should be funded for attempting to build technologies that the government does not need. Even though there are a lot of unanswered questions, this workshop helped to unify individuals from different institutions in an effort to change the biotechnology landscape.

At the end of the workshop, participants were asked to predict what the headline would be in the year 2025. One of the participants said, "Kids win prize for self-designed bio-printed Halloween costume but school under fire." I believe that this headline is the perfect embodiment of what the participants in the workshop hope to prevent.

More information about this workshop and participants' background is available at https://futureofbiology.wordpress.com/

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