

# CASE STUDY: InnovATEBIO case report

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## EXECUTIVE SUMMARY

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InnovATEBIO is leveraging the assets developed under Bio-Link and continuing and expanding efforts that were successfully piloted under Bio-Link. Several Bio-Link spin-off innovations have been brought under the banner of InnovATEBIO to facilitate coordination and dissemination among the network. The InnovATEBIO leadership has expanded, and the center which launched at the start of the pandemic has embraced virtual tools for expanding the network.

## PURPOSE AND BACKGROUND

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### Bio-Link

Bio-Link was launched in 1998 as “Bio-Link: A National Advanced Technological Education Center for Biotechnology,” funded by the National Science Foundation, with center funding in 2009 and 2014, finally sunsetting in 2018. Bio-Link was formed to prepare technicians to meet industry needs. The three goals during the last award cycle (2014) were to:

- Utilize Bio-Link’s network of information sharing to foster communities of practice that enhance the preparation of skilled biotechnology technicians.
- Deepen and diversify industry outreach and engagement to ensure that education programs nationwide respond to biotechnology industry needs.
- Increase access to and use of educational and training resources to improve student skill attainment.

The Bio-Link National Center was headquartered at City College of San Francisco (CCSF) with PIs from around the country. When Bio-Link sunset in 2018, over 40 states had taken advantage of Bio-Link offerings through over 109 programs. Over the course of Bio-Link’s 20 year history, the Center maintained a focus on the core goals, with the Summer Fellows’ Forum which brought approximately 70 community members, mostly faculty and administrators from Biotechnology education programs from across the country, together for a week every the summer to share best practices and innovations in biotechnology education. Co-PI Sandra Porter notes that the Center was largely focused on the Summer Fellows Forum. A focus on regional hubs and individual members across the country and a 20 year history developed a rich community of educators. Several complementary efforts emerged, including: a community college undergraduate research initiative (CCURI); a Consortium for Advanced Manufacturing of Cell & Tissue-based Products (CAMCTP); the Biotech-Careers.org website; the Austin Community College Bio-Link Regional Center and; the Northeast

### InnovATEBIO

InnovATEBIO, the National Biotechnology Education Center, was funded in 2019 as a successor to Bio-Link. InnovATEBIO is located at Austin Community College in TX and continues the goal of improving technician education in support of the biotechnology workforce. The new Center serves as the nexus for biotechnology technician education providers by supporting, disseminating and scaling practices in the community. The center goals are to:

1. develop a collaborative infrastructure that supports innovation, and promptly addresses the changing needs of the biotechnology community;
2. coordinate and leverage outputs from ATE-funded biotechnology projects;
3. identify opportunities to generate partnerships and collaborations that accelerate innovation in biotechnology education;
4. monitor and address emerging biotechnology industry and technician workforce trends; and
5. develop a regional outreach and mentoring infrastructure to broadly engage underserved populations in biotechnology labs and related emerging technologies.

Included in the leadership of InnovATEBIO is PI Linnea Fletcher, a co-PI of the Bio-Link center and former NSF Program Officer, and several others representing longtime members in Bio-Link and leaders of several affiliated initiatives. InnovATEBIO created a more expansive organizational home for efforts Bio-Link inspired.

InnovATEBIO, which launched a few months prior to the start of the pandemic worked hard to leverage technology and virtual networking tools which has resulted in a rise in newsletter subscriptions (from 1304 in March 1, 2020 to 1752 worldwide 12 months later). Dr. Porter notes “InnovATEBIO has truly expanded, and

Biomanufacturing Center and Collaborative (NBC2) housed at Montgomery County Community College, and; the Bio-Link Depot.

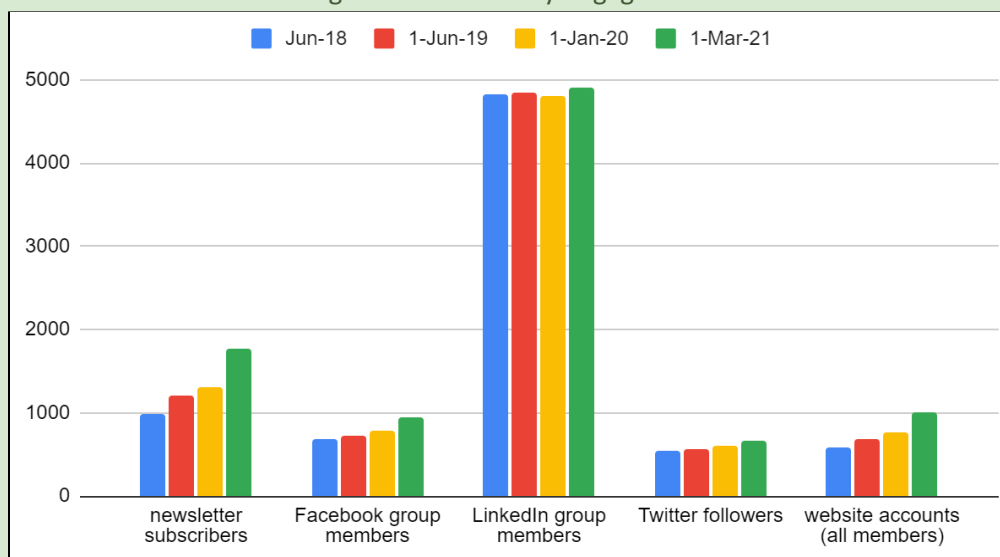
continues to expand the network of people that we serve.” Figure 1, below, shows the maintenance of the community during the transition period, with growth during InnovATEBIO’s first year of funding, which coincided with the pandemic.

## Transition Process

This report describes the transition between long-standing Bio-Link and InnovATEBIO as it relates to the identification of the elements to be sustained or leveraged under the new Center; the shift in leadership structure and; the Center’s value to the biotechnology community.

Three years before the Bio-Link grant sunset, PI Fletcher, who had a regional center grant, worked with the Bio-Link community to explore the future options for supporting the Bio-Link community and maintaining the other assets of the Bio-Link Center.

Figure 1: Community Engagement



## The Bio-Link Gap Analysis

The gap analysis relied heavily on the extant Bio-Link network. As part of a regional center grant, PI Fletcher spent three years connecting with network members at ATE PI meetings, soliciting feedback on what elements of Bio-Link worked well, and what else members wanted from a biotech center. During this time, PI Fletcher was also considering what leadership characteristics would be needed for the new Center to ensure long-term impact and sustainability and identifying potential candidates.

Guiding the gap analysis was the PI’s philosophy of a Center; specifically that a Center’s role should focus on dissemination, but more importantly, scaling. PI Fletcher sees dissemination as providing information relevant to biotechnology education; but scaling is increasing the capacity of the member network to provide quality education. The community feedback suggested that while Bio-Link was excellent at dissemination, for example managing an invaluable newsletter, there was an opportunity to scale ideas by strategically nurturing ideas within the community. For example, rather than just documenting new practices “if someone has a good idea for a workshop, we help sponsor it” in an effort to both distribute leadership and promote knowledge creation and exchange in a rapid manner.

## Findings from the Gap Analysis: Strengths

Findings from the gap analysis identified several assets of the Bio-Link center to protect and build upon. Bio-Link was particularly successful in developing a community of educational partners. As the Center grant ended, there was an active network of 109 Biotechnology programs, 89 high school programs and some expansion into 4-year programs. PI Fletcher notes that “the community itself was a major product because Bio-Link did a really good job of recruiting,

mobilizing and getting the community on board.” She went on to note that this is evidenced by the willingness “to give constant feedback in an effort to help shape the proposal” to preserve and extend the Bio-Link community and support.

## Findings from the Gap Analysis: Opportunities

Areas where InnovATEBIO can leverage work begun under Bio-Link include diversifying the network and organizing information. For example, working with high schools may be particularly timely as Career and Technical Education programs move towards entry-level certification. Bio-Link supported the [Biotechnician Assistant Credentialing Exam \(BACE\)](#), an industry-recognized exam designed to assess core skills and knowledge sets identified by industry and represented within the academic and performance standards of Biotechnology programs. This exam is currently offered through the University of Florida and could serve as the model for scaling widely.

The network can also be diversified by increasing participation of industry and trade organizations. Strategic relationships will be essential for advancing the mission of preparing a biotechnology technician workforce through 2-year programs and addressing company hiring practices to increase their consideration of community college graduates. In some regions, there is a bifurcation in the field where well-established companies have so many applicants they hire technicians who have graduated with a degree in biology from elite four-year schools, whereas start-up companies are often competing with each other to fill their positions. In other areas, particularly on the west coast, nearly half of the students that enter 2-year biotechnician programs hold a bachelor's degree or more and graduate with many job prospects.

One of the activities that began under Bio-Link, which is gaining greater focus under InnovATEBIO, is the annual survey of the [Coalition of State Biosciences Institutes \(CSBI\)](#). CSBI began in 2012 as a collaboration of 42 state bioscience trade organizations and the Biotechnology institute, an offshoot of lobbying groups. These organizations come together to address workforce-related issues, including industry-led education and entrepreneurship efforts through a nationally coordinated approach. CSBI runs an annual survey, which was funded in part by Bio-Link. The annual survey asks employers what their hiring needs will be for the next year and what skills they are seeking. Early on, this survey had a heavy focus on the California region (where most biotech is)<sup>1</sup> but under InnovATEBIO, the survey is expanding to different states as a condition of continued financial support. Additionally, InnovATEBIO is supporting building a network of survey takers that go beyond CEOs to include those that are more closely connected to the hiring practices of the companies. This will help uncover what opportunities and connected skills may be needed in different regions of the nation and how community colleges may meet these needs.

## InnovATEBIO: Evolving the Biotech center model

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### Leadership

Bio-Link had been run under a small leadership team with a heavy emphasis on serving community college instructors. Bio-Link leadership was very supportive of efforts that grew out of Bio-Link, ensuring they were promoted and supported within the community, but did not oversee them. Under InnovATEBIO, the leadership team expanded. InnovATEBIO envisions developing regional hubs that will help distribute leadership among the community. InnovATEBIO also united some of the dispersed initiatives under the InnovATEBIO banner to promote alignment, dissemination and scaling.

The expansion of the leadership team has brought new skills and perspectives to the organization. As with any transition, however, there have also been challenges. Bringing together people with different priorities requires negotiation. For example, there is an initiative on undergraduate research with a high impact practice for deep engagement of any student. Not all community college students, however, are seeking a research experience or further education, rather some are seeking concrete skills to secure employment requiring a more flexible approach that, according to Dr. Porter requires “a reconciliation of the lofty ideals with the reality.”

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<sup>1</sup> The 2014 report can be found at: <https://bio-link.org/publication/life-science-and-biotech-middle-skill-workforce-2014>

PI Fletcher sees her role as a steward of the community, facilitating a shared vision, messaging, and resources among community members, developing future community leaders and advocating for community college biotechnology training programs with industry, professional organizations and the government. For example, a 2021 grant opportunity through the Department of Defense to modernize biotech education ignored community colleges in the planning efforts, as they weren't aware of the work being done on these campuses. PI Fletcher encouraged interested members of the *InnovATEBIO* network to include in their proposals consistent messaging about the current state of biotechnology education at community colleges.

## Expectations for Members

Bio-Link and *InnovATEBIO* both focus on the network. The key differences between Bio-Link and *InnovATEBIO* as observed by Dr. Porter, “have been in the methods of reaching out to the community. Bio-Link functioned at a time that was pre-pandemic. We spent much of our time planning, organizing, and attending in-person conferences, many of which were held in conjunction with other conferences.” Thus, she continued “Bio-Link engaged with the community through some very labor intensive efforts that required a lot of time and travel.” *InnovATEBIO* has made use of videoconferencing. Although Dr. Porter noted a sense of loss without the face to face gatherings, they were not feasible for all to attend and limited the direct audience to faculty and administrators who had the time and resources to attend.

Membership for organizations and individuals in *InnovATEBIO* is free, though a sign up is required to validate credentials for access to materials, and members make a commitment to providing annual updates with data about their programs and companies that hire their students. This allows *InnovATEBIO* to communicate with members and create aggregate reports about biotechnology education. *InnovATEBIO* is charged with helping members stay abreast of the innovations and emerging trends in the field. PI Fletcher notes that for effective leadership among member programs, “you cannot just become someone who just runs a program. And, you can't just become an administrator, you have to stay a scientist.” Dr. Porter also notes that there is also changeover in the community as members retire or new leaders emerge, “there's always some ongoing work and reconnecting and making sure the new people are aware of the resources, and helping them tie into the community.” Thus PI Fletcher notes “It's just a requirement that you have to coordinate your community, and then know what your community's doing. That's the PI's job. But it's not just the Center's job, it's every projects' job. And to be quite honest, it should be. I personally have been pushing my 109 biotech programs to know what everybody else is doing.”

## Expanding engagement with Industry and trade organizations

Workforce development is at the core of *InnovATEBIO*'s mission. *InnovATEBIO* serves at the nexus of industry and education. This requires working with industry and trade organizations to gain support for employing people trained through the community college system. *InnovATEBIO*'s PI advocates for graduates of community college biotechnology programs to be seen as central to the biotechnology workforce. Including industry and trade organization leadership on an advisory board helps increase the awareness of and value seen in the members' educational programs and graduates. The *InnovATEBIO* advisory board, called the [National Industry and Workforce Advisory Council](#) (NAC) utilizes the [BILT model](#) to engage biotech industry and workforce partners to guide the center's programs. It also helps industry, workforce and education partners collectively remain current on workforce trends and educational approaches to preparing a technological workforce.

*InnovATEBIO* also works with state biotech trade associations to advocate on behalf of the biotech programs, faculty, and students, and make sure that companies know that *InnovATEBIO* programs prepare students for professional careers with opportunities for advancement.

*InnovATEBIO* also centers around a national approach to developing the Biotechnology workforce. Though half of the biotech industry is based in California, *InnovATEBIO* is less California-centric; *InnovATEBIO* supports programs across the nation that are supporting students.

## Evidence-based planning

The annual CSBI survey identifies industry trends and an annual survey of InnovATEBIO members' needs and initiatives will result in an annual report on best practices in biotech education and feedback from educators. Marrying the CSBI and the InnovATEBIO member surveys together will lead to a coordinated and systematic approach for the field to guide the work over the next year. Other forms of evidence are also being gathered:

- Reaching out to alumni to understand their career trajectory
- Monitor job postings that are based on skill standards and competencies, rather than degrees as a sign of a culture shift within the field.

## Rapid response to community needs

Members are frequently invited to events and webinars. These events and webinars are developed based on community feedback and needs. Rather than just gathering the community on an annual basis, InnovATEBIO is committed to a rapid response and just-in-time support for members. Conversations in the community's Facebook group led to a 16-week webinar series addressing the topics raised. For example, when campuses went remote due to COVID-19 restrictions, instructors used one of the discussion forums to highlight the need for on-line alternatives to lab activities. InnovATEBIO immediately developed a 5 week professional development series. Similarly, the community has been asking for an updated workshop on manufacturing. The center sponsored community members who are biomanufacturing experts to prepare and lead a two-day long workshop. The event was recorded and this resource is available to the community.

Bio-Link identified a wealth of resources over 25 years, such as laboratory exercises, classroom lessons and other curricular materials. These materials were not maintained, and many are either out of date or have broken links. InnovATEBIO aspires to curate some of this material to ensure currency and accessibility.

Within Biotechnology-related areas, there are skill standards that are defined, measurable and industry validated. Using these as a blueprint can facilitate alignment between industry and education with clarity in communication. The curricula may look different in different sites, but the standards will be consistent. A 2021 Department of Defense (DoD) grant presented an opportunity for several InnovATEBIO members to secure funding related to skills standards. PI Fletcher saw the DoD RFP as an opportunity for the community to obtain funding from a new source outside of NSF. Rather than applying on behalf of the member organizations, PI Fletcher encouraged members to apply directly using a coordinated message in an effort to both distribute funding among the community and as a way of aligning technical education rather than having a fragmented approach.

## Leadership development

InnovATEBIO is committed to growing the leadership within the community by formalizing the leadership development process. A Leadership Institute is part of the Center's grant and is modeled on industry practice. PI Fletcher identified the following characteristics of leaders in a servant leadership role:

- Leaders must be successful in running their own projects and grants
- They manage their time well
- They have the capacity to listen to the community and incorporate the community voice into their work. This means they are willing to "look beyond themselves"

## LESSONS LEARNED

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- They manage their time well
- They have the capacity to listen to the community and incorporate the community voice into their work. This means they are willing to "look beyond themselves"
- Leaders are highly collaborative and realize success depends on collaboration
- Leaders are not shy; they express their ideas openly
- They are able to juggle the politics of working across institutions, states and content areas.

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### **Lessons Learned**

Evolving a community requires engaging that community to define the scope and purpose of the group. By conducting the gap analysis, InnovATEBIO was able to evolve the core functions of the center which protects the largest Center asset-- the network.

Maintaining and growing the network required moving from a high-touch approach, which was important as the community and the field of biotechnology education formed and matured under Bio-Link. InnovATEBIO has leveraged the resources of the community to act as a knowledge broker and facilitator for the network. They have moved to a more virtual and nimble model as the community grows. This allows more people to access the resources and has promoted a rapid-response to needs as they arise. Most importantly, the Center is able to facilitate a shared vision and represent the value of community college biotechnology education as an important component of the Biotechnology workforce with industry, professional organizations and government.