BioConnect Iowa

2021 ANNUAL REPORT

2021 saw numerous accomplishments and changes for BioConnect Iowa highlighted throughout this report. Of particular note:

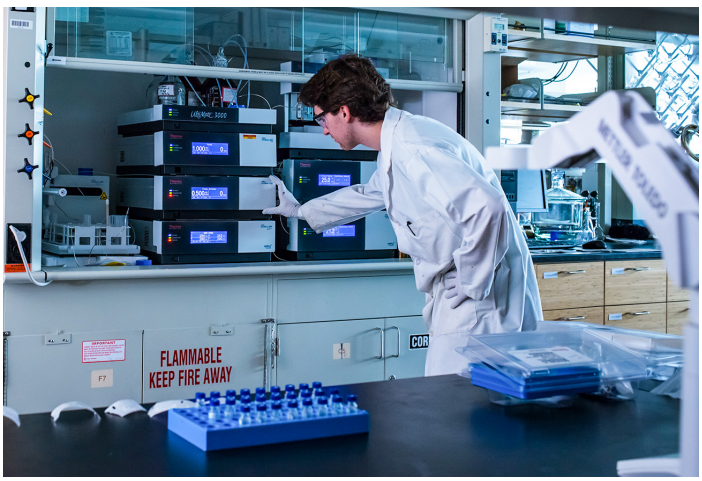
- The US Economic Development Administration-funded Iowa G2M (Go-to-Market) Project is now fully underway, with the first cohort completing the accelerator program in early October and the online resource guide, HighTech Connect Iowa, launched later that month.
- FY2022 saw a more than 3-fold increase in the appropriation provided to Iowa State University (ISU) and the University of Iowa (U of I) for Bioscience activities. Building on the momentum created by the one-time FY2021 funding to ISU and U of I, this increased appropriation has boosted the BCI-university partnerships through further expansion of programs and staffing across all platforms.
- Two new Chief Technology Officers joined Iowa State University to support the state of Iowa's biosciences-based economic growth initiative to identify and accelerate development of new technologies with strong commercial potential. Dr. Michael Roof leads the Vaccines and Immunotherapeutics research and innovation platform and Dr. Nadilia Gomez leads the Digital and Precision Agriculture research and innovation platform.
- During the summer, Jim Register announced his intention to retire and step down from his role as President and CEO. Paul Schickler, BioConnect Iowa board chair, noted that, during Jim's tenure, he strengthened the relationships with Iowa's research universities and broadened support to the startup community. Following a search, Steve Brody joined BioConnect Iowa as President and CEO in December.

BIOSCIENCE PLATFORMS

BioConnect Iowa's (BCI) focus is on four bioscience platforms: the Biobased Chemicals/Products Platform, the Precision and Digital Agriculture Platform, the Vaccines and Immunotherapeutics Platform, and the Medical Devices Platform. These four platforms were identified in a 2017 study performed by TEConomy Partners, Inc. for the Iowa Economic Development Authority (IEDA), www.iowaeda.com/UserDocs/IABIO_Report_122017.pdf to answer three questions:

- What are Iowa's existing and emerging bioscience research core competencies?
- In which bioscience sectors is Iowa seeing translation of these research core competencies into commercial activity and competitive technology platforms?
- What strategies can help Iowa capitalize on these opportunities for further bioscience-based economic development?

Among the strategies identified in the report to develop bioscience in the State of Iowa was the establishment of an Iowa bioscience development center as a public/private economic development initiative focused on coordinating existing assets and strategy implementation and actions to advance Iowa bioscience platforms and overall sector growth. Legislation was enacted in 2019 that repurposed the Iowa Innovation Corporation and established a bioscience development corporation that is now known as BioConnect Iowa.



To fulfill BCI's mission of fostering and accelerating commercialization of innovative bioscience products originating in Iowa, it focuses its efforts in two areas: (i) transition more opportunities from research into commercial development ("fill the pipeline") and (ii) help ensure that the most promising opportunities can access the resources needed to be successful ("advance the pipeline"). Central to the first focus area are partnerships with Iowa State University (ISU) and the University of Iowa (U of I). Although the Iowa G2M program, described in greater detail in this report, is not restricted to biosciences, both parts of the program were designed with bioscience startups in mind and the program is therefore key to success in the second focus area.

The close partnership between BioConnect Iowa, Iowa State University and the University of Iowa is expanding the reach and impact of Iowa's research institutions bioscience-focused innovation. The Legislature's appropriations for FY2022 increased to over $2.6M for ISU and to approximately $875K for U of I. Building on the combined State appropriation and BCI funding during FY2021, for the first time, efforts have moved forward to expand all four platforms, including university staffing where appropriate and new and/or expanded programs, such as seed grant programs to advance commercially directed university Research and Development (R&D) programs.

With Chief Technology Officer (CTO) positions now funded for all three ISU/BCI partnership platforms, BCI Commercial Officer Steve Smith is working with CTOs across platforms and consulting with entrepreneurially minded faculty and early-stage startups. He also works with the ISU CTOs, pulling in other stakeholders from ISU and IEDA as appropriate, to assist bioscience companies looking to relocate and/or expand in Iowa. One example has been partnering with the Cultivo Ag Innovation Program operated by America's Cultivation Corridor to educate participating companies about Iowa and connect them with a variety of private and public sector resources.

BIOBASED CHEMICALS / PRODUCTS PLATFORM (ISU PARTNERSHIP)

ISU Chief Technology Officer (CTO) Sundeep Vani resigned effective October 1, 2021 and as of this writing the search for a new Biobased Chemicals/Products Platform CTO is underway.

In late 2020, the US Department of Defense announced an $87M, seven-year award to the "BioIndustrial Manufacturing and Design Ecosystem" (BioMADE) for a new Manufacturing Innovation Institute headquartered at the University of Minnesota. BioMADE is a group of companies, universities, and community colleges apanning 31 states focused on advanced bioindustrial manufacturing – making chemicals into the products around us using biology. ISU is a member of BioMADE and, before leaving ISU, Sundeep Vani led development of a proposal including Cargill and Genomatica as industry partners that was one of the first projects approved by BioMADE. Total funding for the two-year project is $2.13M, with $1.05M from BioMADE to ISU, $120K from BioMADE to one of the industry partners, $870K in-kind match from the industry partners and $150K cash match from the State of Iowa's bioscience appropriation to ISU.

Leveraging ISU's fermentation facility is central to developing and growing industry-university interactions in this platform. In partnership with BCI, FY2021 BCI funding was used to enhance existing capacity in ways that better meet industry needs. Efforts are also now underway to form a public-private partnership that will increase ISU fermentation capacity to 5000L from the current 1000L. While 1000L capacities are found at multiple universities in the Midwest, 5000L capacity is rare. Operating a 5000L fermenter would greatly enhance ISU's ability to work with industry partners during process scale-up.

The Biobased Chemicals / Products seed grant program was modified to promote expansion of faculty research into new areas aligned with industry and investment trends. BioConnect Iowa staff had an active role in the early-stage research seed grant panel reviews conducted by Iowa State University.

PRECISION & DIGITAL AGRICULTURE (ISU PARTNERSHIP)

BCI funding to ISU enabled the university to hire Nadilia Gomez, formerly the Executive Director of the Iowa Agritech Accelerator, as CTO for the Precision and Digital Agriculture Platform in early 2021. For the first time, there was a full complement of CTOs for the three BCI/ISU partnership platforms.

Market analysis done in 2020 in partnership with BCI, surveying industry perspectives on opportunity areas in crop and plant science, helped identify areas of ISU research and entrepreneurial activity with the most potential. As a result, BCI and ISU are exploring strategic partnership opportunities between ISU, startup companies and major corporations. In 2021, a similar market analysis has been initiated for the livestock industry. The analysis will include input from target companies using digital ag solutions to manage livestock production systems as well as startups and companies trying to deliver new precision livestock digital offerings.

During 2021, BCI participated in a concerted effort across ISU Colleges and Departments to articulate how ISU could develop a testbed and demonstration site for digital and precision ag offerings being developed within or outside of ISU. The outcome of this effort may help address increasing demand from startups that need to test their offerings at farm scale, increase producers' awareness of the latest digital and precision ag offerings, and strengthen ISU's position as a preferred partner for research and product development in the digital and precision ag space. The effort goes across multiple ISU projects focusing on broadband technology, artificial intelligence, interdisciplinary work connecting crop and livestock production, and rural development.

VACCINES AND IMMUNOTHERAPEUTICS PLATFORM (ISU PARTNERSHIP)

BCI provided funding to enable ISU to hire Mike Roof as the Vaccines and Immunotherapeutics Platform CTO. To understand opportunities for product development, whether via technology transfer or through a spin-off company, Roof has engaged over the past year with some 80 faculty members and scientists with commercially oriented research programs at ISU, U of I, and the National Animal Disease Center/Animal Research Center (NADC/ARS) located at ISU, and with representatives from over 60 companies.

In addition, CTO Roof has met with executive teams from the six top global animal health companies in an effort to develop strategic partnerships with ISU that will expand funding and accelerate commercial activity. One firm has committed to a four-year collaboration with over $1 million in funding, and advanced discussions are underway with two other companies.

In May, BCI funding helped enable a virtual Vaccines and Immunotherapeutics meeting to promote technology and connect with key industry partners. 150 people registered, with global attendance from the US, Germany, Japan, Argentina, and India.

BCI's Steve Smith is a member of a 10-person commercial support team, with expertise in capital acquisition, regulatory processes, legal and manufacturing, that was formed in 2021 to support faculty-based startup activity. To date, three companies have been supported.

The platform seed grant program is being expanded during FY2022 to include projects that have advanced further towards commercialization, including some driven by the industry partner.

MEDICAL DEVICES PLATFORM (U OF I PARTNERSHIP)

U of I Chief Innovation Officer Jon Darsee has operational responsibility for the Medical Devices Platform. Through a combination of the FY2021 appropriation, BCI funding, and the increased FY2022 appropriation, Darsee has focused on expanding existing foundational initiatives (Capital, Culture and Talent) to drive entrepreneurial behavior that transforms more medical research from "bench to bedside" and creates more commercial medical technologies.

This includes several specific programs:

- Expanding and building deeper connections between faculty entrepreneurs and industry executives and technical experts around the world.
- Recruiting and replenishing U of I's Entrepreneur in Residence group will support BCI's strategic communication efforts to better support collaboration within and between public universities in Iowa as well as with external alumni stakeholders to enrich the local talent pool.
- Exploring a new initiative to attract post doctorate students and graduate students to non-academic career paths, giving them exposure and opportunities to apply their talents to bioscience start-ups and established companies in the State of Iowa.

SMALL BUSINESS INNOVATION RESEARCH AND TECHNOLOGY TRANSFER OUTREACH PROGRAM

FY2021 was a successful year for the SBIR/STTR Outreach Program, with over 50% of Iowa businesses receiving awards following their SBIR/STTR program reviews.

The US Small Business Administration's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are highly competitive programs that encourage small businesses in the US to engage in Federal Research/Research and Development (R/R&D) with the potential for commercialization. Recognizing that few Iowa businesses were applying for SBIR/STTR awards and that the rate of successfully receiving awards was low, the IEDA established the SBIR/STTR Outreach Program, managed by BCI, to provide support for and assistance to innovative Iowa businesses seeking federal funding through the SBIR and STTR programs.

As set out in the Table 1, during FY2021, BCI provided support and assistance to fifty-two Iowa businesses that submitted to the SBIR/STTR Outreach program. Of the fifty-two applications, 30 reviews were completed, and 16 of those received awards, for a greater than 50% success rate. Decisions remain pending for 22 applications.

A comparison of the number of applications BCI supported and success rates for FY2021 relative to the previous three fiscal years are set out in Table 1.

The BioConnect Iowa SBIR/STTR outreach program is a critical element for maintaining our competitiveness in building and growing new, high-value, high-impact technology-based companies in Iowa. The many federal SBIR/STTR programs provide non-dilutive research grants to young companies, but they are highly selective and have lengthy application processes that are difficult to navigate. The consultants used by BCI are experienced and efficient. They increase the success rate of applications.

Nigel Reuel, Ph.D.
Founder, Skroot Laboratory Inc., Zymosense Inc., Frugi Biotechnology Inc.

Table 1. Iowa SBIR/STTR Outreach Program Performance, FY2018-FY2021

FISCAL YEAR	APPLICATIONS SUPPORTED	AWARDS*	DECISIONS PENDING	SUCCESS RATE
2018	60	8	0	13%
2019	52	17	0	32%
2020	46	13	0	28%
2021	52	16	22	>31%**

*The Awards figure represents the number of awards made for applications submitted during the indicated year, independent of when awards were made.

**Final success rate could be higher, depending on decisions made regarding pending applications.

During FY2021, 12 Iowa companies received Phase 1 awards, seven Iowa businesses received Phase II awards, and one Iowa business received two Phase 2 awards. Phase I awards were received by Big Data in a Box, TdVIB, Theion Agriculture, Nistron, Malum, Percev, Firefly Photonics, Parametric Studio PowerPollen, MTI Biotech, Superior Statistical Research and Soil Serdem. Cellular Engineering Technologies, StarrMatica Learning Systems, iotaMotion, PaniClean, Viewpoint Molecular Targeting (2 awards), Skroot Labs and NanoMedTrix received grants for Phase II projects.

IOWA GO-TO-MARKET (G2M) PROGRAM

The Iowa Go-To-Market (G2M) program, funded through a grant from the US Economic Development Administration as part of its Build To Scale program, was fully launched during 2021. The G2M Accelerator program provides targeted 1-on-1 mentoring, pro bono business support and group workshops for research-driven, high-tech companies, specifically designed to meet their needs at this point of their business launch. The program is designed for companies developing innovative products or services in Iowa. It is managed and supported by BCI, ISU Startup Factory, and VentureNet Iowa. The first cohort of businesses completed the G2M Accelerator Program in early October 2021 and the online resource guide, HighTech Connect Iowa, was launched later that month.

G2M ACCELERATOR

Following review of applications using the process that program partner VentureNet Iowa has developed for State funding programs, five companies were accepted into the first cohort, which ran from late February to early October. The participating companies were:

- **CartilaGen**, which is developing a medical technology, exclusively licensed from the University of Iowa, for the prevention of post-traumatic osteoarthritis.
- **Classroom Clinic**, which is developing a telehealth platform and provider network to provide students in rural school districts with improved mental health services.
- **FBB Biomed**, which is creating blood and saliva tests to predict critical health outcomes.
- **Mazen Animal Health**, which is developing orally delivered animal vaccines produced in corn.
- **Eitri Automation** (formerly Sushi 3D), which is developing a service platform for rapid and cost-effective design, production, and delivery of machined 3D prototype parts.

Due to COVID-19 restrictions in place in February, BCI and program partner ISU Startup Factory operated the initial program remotely. With Iowa startup leadership increasingly operating from multiple locations, inside and sometimes outside Iowa, it has been recognized that this approach will be necessary to achieve the program's desired statewide reach and therefore the program will continue to be run primarily virtually in the future.

All companies participated in workshops focusing on sales and sales prospecting, branding / marketing, capital acquisition and team building / leadership. Two panel sessions with experts providing multiple perspectives on (i) capital acquisition and (ii) types and sources of entrepreneur support in Iowa were also held; these sessions were open to the public. Participants received guidance from program leadership and the opportunity to work with sector-relevant mentors and were connected with a variety of service providers based on company needs. The program wrapped up with a public Pitch Day in early October, for which over 100 attendees registered.

To better integrate with other programs run by partners ISU Startup Factory and VentureNet Iowa, the program schedule will be modified starting in 2022 from a single cohort starting in February to three smaller cohorts with start dates in February, June and October. Recruitment for the February 2022 cohort is ongoing.

HIGHTECH CONNECT IOWA LAUNCH

HighTech Connect Iowa (www.hightechiowaconnect.org) is an online guide that connects Iowa's research-driven high-tech startups to relevant public and private resources. The needs of High-tech startups to grow and thrive are unique and complex because they typically involve intellectual property, and product development timelines are often long and costly. The resource developed by BCI in partnership with IASourceLink (a partnership between IEDA and the University of Northern Iowa), Pitchly, and VentureNet Iowa, was launched in October.

For public resources, HighTech Connect Iowa directs users to content on IASourceLink. For private resources, users are connected directly to each resource's website. During the upcoming year, BCI's focus will expand the resources listed and make enhancements as appropriate.

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