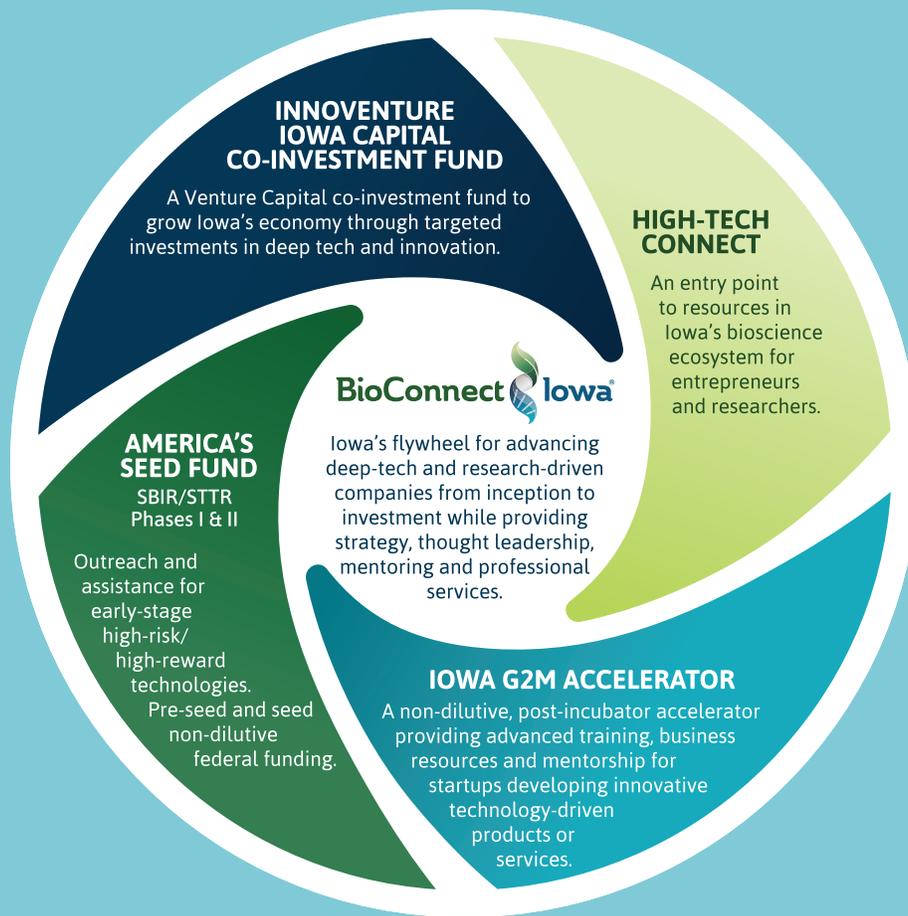




BioConnect  Iowa

2022
**ANNUAL
REPORT**





2022 saw growth, impact, accomplishments and significant new initiatives for BioConnect Iowa to accelerate the growth of Iowa's bioscience sector by moving good ideas into successful commercial endeavors. Highlights include:

- Iowa's first publicly-funded venture capital fund—the InnoVenture Iowa Fund — was formed in August to support early-stage startup companies. The launch included the inaugural "InnoVenture Iowa Challenge", now an annual statewide pitch competition celebrating Iowa-based startups and Iowa's entrepreneurial ecosystem, activities and successes.
- A refresh of the Iowa Bioscience Strategy started in July. The updated study is assessing and refining the 2017 strategy by evaluating emerging bioscience opportunity areas, trends, technologies and market associated with Iowa's four core bioscience platforms. Publication is planned in 2023.
- Iowa-based researchers continue to benefit from the efforts of the SBIR/STTR Program Office and the Americas Seed Fund, the largest source of early-stage, non-dilutive funding in the United States. In 2022, 34% of Iowa companies applying through BioConnect Iowa's Program Office received funding – more than 3 times the national average for projects awarded, 10%.
- Two new cohorts completed programming in the Iowa G2M Accelerator, the partnership between Iowa State Startup Factory, VentureNet Iowa and BioConnect Iowa. The Iowa G2M accelerator helps companies continue to grow and to connect them with resources they need at this stage of their pathway to commercial success.
- The BioConnect Iowa team continues to work closely with the Office of the Vice President for Research, the Bioscience Platform Leads and Chief Technology Officers at Iowa State University and the Chief Innovation Officer and UI Ventures team at the University of Iowa, who are successfully driving bioscience innovation commercialization through their leadership, personal commercial experiences, relationships and contacts.

IOWA'S BIOSCIENCE STRATEGY, BIOCONNECT IOWA AND STRATEGIC PLATFORMS

In 2017, TEconomy Partner's completed a comprehensive study and report, "Iowa Bioscience Development: Core Competency Analysis, Platform Identification and Crosscutting Strategies" focusing on answering three questions:

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

Based on Iowa's core competencies, TEconomy Partners identified four platforms where Iowa has a leadership position based on research strengths, industry activities, potential competitive advantage factors and promise for Iowa economic development AND that would benefit from state programs, industry-university partnerships and other sector stimulating activities:

- Biobased Chemicals/Products
- Medical Innovation/ Devices.
- Precision and Digital Agriculture, and
- Vaccines and Immunotherapeutics

The 2017 TEconomy report also identified four strategies to implement, with the first strategy to establish an Iowa bioscience development center as a public/private economic development initiative with the focus on coordinating existing assets, strategy implementation and actions advancing Iowa bioscience platforms and sector growth. Legislation enacted in 2019 repurposed the Iowa Innovation Corporation and enabled the Iowa Economic Development Authority (IEDA) to establish BioConnect Iowa as the bioscience development corporation.

"Iowa benefits greatly from the bioscience sector. By any economic measure – the number of companies, economic output and exports, employment and average wage – Iowa's biosciences industries are important to the state's continued economic growth and development. Specialized, growing and paying strong, family sustaining wages – biosciences are critical to Iowa's current economic success and hold much potential for further development."

TEconomy Partners, 2017

Five years later, BioConnect Iowa works closely with Iowa State University and the University of Iowa on the four bioscience platforms identified as priorities, as well as implementing the four strategies identified in the report. BioConnect Iowa's effort and programs are built to advance deep-tech and research-driven companies from inception to investment while providing strategy, thought leadership, mentoring and professional advisory services, primarily focusing upon:

- Transitioning more opportunities from research into commercial development ("filling the pipeline"), and
- Helping ensure the most promising opportunities have access to the resources needed to be successful ("advancing the pipeline").

Central to "filling the pipeline" are BioConnect Iowa's partnerships with Iowa State University and the University of Iowa and relationship-building efforts with other Iowa universities and colleges, private industry, economic development organizations and others across the State of Iowa and regionally, broadening awareness of Iowa's bioscience focus, and key programs such as the Americas Seed Fund (SBIR/STTR) Outreach Program.

For "advancing the pipeline" the Iowa G2M Accelerator, High Tech Connect, BioConnect Iowa's advisory services program and the InnoVenture Iowa Fund are the foundational programs.

IOWA'S BIOSCIENCE PLATFORMS

BIOBASED CHEMICALS / PRODUCTS PLATFORM

Kevin Moore, Chief Technology Officer
Iowa State University

In the last year, this platform's innovation ecosystem continued to expand, supporting commercially relevant research and development and connecting industry to university faculty. This platform also continues to focus on adding scale-up capability and infrastructure to support commercialization of biobased products.

Key emphases and accomplishments in 2022 included:

- Kevin Moore joined Iowa State University as the Chief Technology Officer in January. Prior to joining Iowa State, Moore had leadership roles at Trucent, Inc., and prior to that, a 27-year tenure with Archer Daniels Midland (ADM) Company.
- Eight (8) projects were supported with emerging technology and technology demonstration grants in areas such as biobased fertilizers, animal probiotics, biopesticides, asphalt additives and soil amendments. Ten projects are in process for seed and technology grants in areas from plastics upcycling to biobased acoustic tiles to nutraceutical production via fermentation.
- Key scale-up and commercialization efforts include a flexible, large scale fermentation demonstration project, and the Iowa State Center for Crop Utilization Research completed work for 32 biotechnology companies from across the USA.
- The United States Defense Department-funded Manufacturing and Design Ecosystem (BioMADE) issued their largest grant for a Department of Energy grant involving Iowa State, Cargill and Genomatica.
- Project work also started on a United States Department of Energy award for a project involving Iowa State, ADM, 3M and Diageo.
- Several Iowa State-related biobased startup companies are realizing significant progress and funding, including Soylei Technologies, Pyrone Systems and Janas Materials.

DIGITAL AND PRECISION AGRICULTURE PLATFORM

Nadilia Gomez, Chief Technology Officer
Iowa State University

The key areas and priorities for the Digital and Precision Agriculture innovation ecosystem include building external partnerships to engage with entrepreneurs to advance the adoption of ag products and services and making advancements in infrastructure for wireless connectivity in rural areas.

Key emphases and accomplishments in 2022 included:

- The Digital and Precision Agriculture platform focused on a combination of initiatives to strengthen research seed grants, industry-relevant innovation challenges and grant support. These included research seed grants focused on swine instrumentation, environmental controls and prediction system, as well as seed grants, technology commercialization, fellowships and scaleup grants.
- Development of an Iowa-led, multistate National Science Foundation Regional Engine application for \$160 million over 10 years. If funded, this project will accelerate research, workforce development and policy initiatives supporting climate-resilient agriculture. This regional grant request includes research collaborations with University of Nebraska-Lincoln, Kansas State and Oklahoma State, and economic development/entrepreneurship focused collaborations with Invest Nebraska, K-State Innovation Partners and the Oklahoma Center for the Advancement of Science and Technology.



- Working across Iowa State University center (e.g., TrAC and WiCI) focused on innovative technologies and methodologies which support a variety of industries, including agriculture. Iowa State University centers attract faculty, industry experts and future talent interested in artificial intelligence, cloud-based deep learning technologies and wireless connectivity.



VACCINES AND IMMUNOTHERAPEUTICS PLATFORM

Mike Roof, Chief Technology Officer
Iowa State University

The focus areas for the Vaccines and Immunotherapeutics platform in 2022 were: (1) expanding innovation and technology available for licensing and commercial development, (2) infrastructure and training, and (3) supporting startups.

Key emphases and accomplishments in 2022 included:

- CYVAX, a vaccine development laboratory focusing on USDA-compliant master seeds, manufacturing scale-up and commercial development material commenced operations, and by the end of the year, had two tenants, with three additional companies considering leasing options.
- In addition, CYVAX – partnering with Bio-Techne – hosted the inaugural ISU-Industry training session focused on commercial development with 25 participants from Iowa State University and nine industry partners.
- External funding through strategic partnerships with Merck Naima Health and Ceva Animal Health.
- Platform Seed Grants supporting public-private collaborative research and with several commercial partners including Merck, Boehringer Ingelheim, LEAH Labs, Arko Laboratories, Nitto BioPharma Inc., Elanco, Genvax Technologies, NeoVaxSyn and Mazen Animal Health.
- Innovation fellowships were awarded which provided resources to allow pursuit of technology licensing, commercial partnerships or a new venture. HALIDE, a University of Iowa startup with a technology focus on stabilization of proteins involved in human therapy, was a recipient.

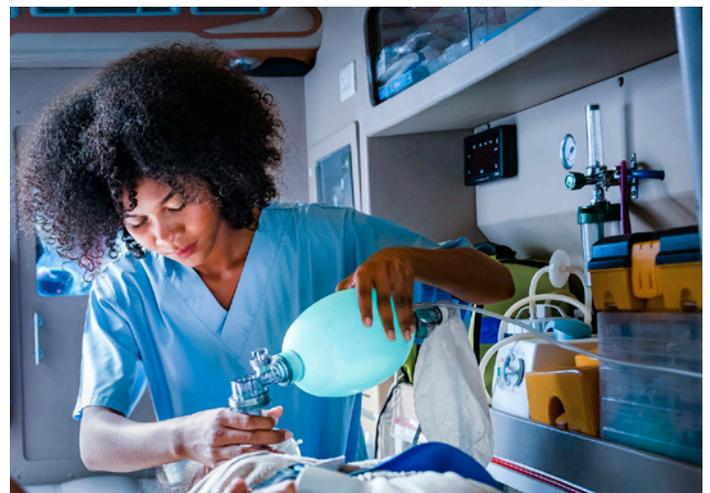
MEDICAL DEVICES PLATFORM

Jordan Kaufmann, Chief Technology Officer
University of Iowa

The focus areas for the Medical Devices platform in 2022 were: (1) expanding the influx of technologies into the commercialization pipeline, (2) improving knowledge of commercialization among early career talent, and (3) supporting startups.

Key emphasis and accomplishments in 2022 included:

- Launch of the Nurse Innovators Program—a statewide initiative funded by the Kauffman Foundation to support clinical nurses in identifying unmet clinical needs and creating solutions with commercial potential. There are 10 active projects.
- Innovation Fellows program—12 early career Fellows were selected to enhance their knowledge of commercialization and to gain exposure to industry experts. The Fellows also acted as a conduit between their respective labs and the commercialization ecosystem to gain and distribute information.
- Secured funding for the Medical Innovation Hub, a leading-edge facility on the University of Iowa medical campus to engage both clinical faculty and external companies in developing and quickly iterating their ideas.
- Provided GAP funding for 7 early-stage projects in the medtech space ranging from devices to better deliver chemotherapy to bladder pressure monitoring to allow them to quickly de-risk their projects and prepare for commercial support.
- Continued supporting new and existing startups in the medtech ecosystem.



AMERICA'S SEED FUND

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Outreach Programs

The US Small Business Administration's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, branded as America's Seed Fund, are highly competitive programs encouraging small businesses to bringing a new technology from idea to commercialization.

Recognizing that few Iowa businesses were applying for SBIR/STTR awards, and that the success rate was low, the IEDA established the SBIR/STTR Outreach Program, currently led by Anne McMahon, SBIR/STTR Statewide Program Coordinator, to provide support for and assistance to innovative Iowa businesses seeking federal funding through the America's Seed Fund programs.

In addition to the support provided by the SBIR/STTR Outreach Program, the IEDA also provides up to \$50,000 to SBIR/STTR awardees.

FY2022 was another successful year for the America's Seed Fund (SBIR/STTR) Outreach Program. In FY2022, the SBIR/STTR Outreach Program worked with 38 Iowa businesses. Twelve Iowa companies were funded, one of which received two SBIR Phase I awards.

Companies receiving SBIR/STTR awards included:

- Receiving Phase 1 awards were: NeoVax, MTI Biotech, NanoSpy, Zymosense (one from the National Institute of Standards and Technology and another from National Science Foundation), Parametric Studio, Juggernaut Life Science, Superior Statistical Research, Brainsoft LLC, Persaj LLC, pxAlpha.
- ETALCY received a Phase 2 Award.

The average FY2022 Phase I award was \$250,000 and the Phase II award was \$963,000. With 13 companies receiving awards, the success rate was 34%.

FISCAL YEAR	APPLICATIONS SUPPORTED	AWARDS*	SUCCESS RATE	FUNDING (in Millions)
2018	60	8	13%	\$ 7.0
2019	52	17	32%	\$ 4.0
2020	46	13	28%	\$ 6.4
2021	52	16	31%	\$11.0
2022	38	13	34%	\$ 4.0



THE INNOVENTURE IOWA FUND

The InnoVenture Iowa Fund is a \$30 million co-investment fund designed to support early-stage startup companies in biosciences, advanced manufacturing and information technology. Funding for InnoVenture Iowa is provided by the IEDA through the U.S. Treasury Department's State Small Business Credit Initiative (SSBCI), a small business aid program which was expanded through the federal American Rescue Plan Act.

As the state's first public venture capital fund, the InnoVenture Iowa Fund is uniquely positioned to close the gap in funding for early-stage Iowa startups while spurring future innovation in industries where Iowa is naturally competitive.

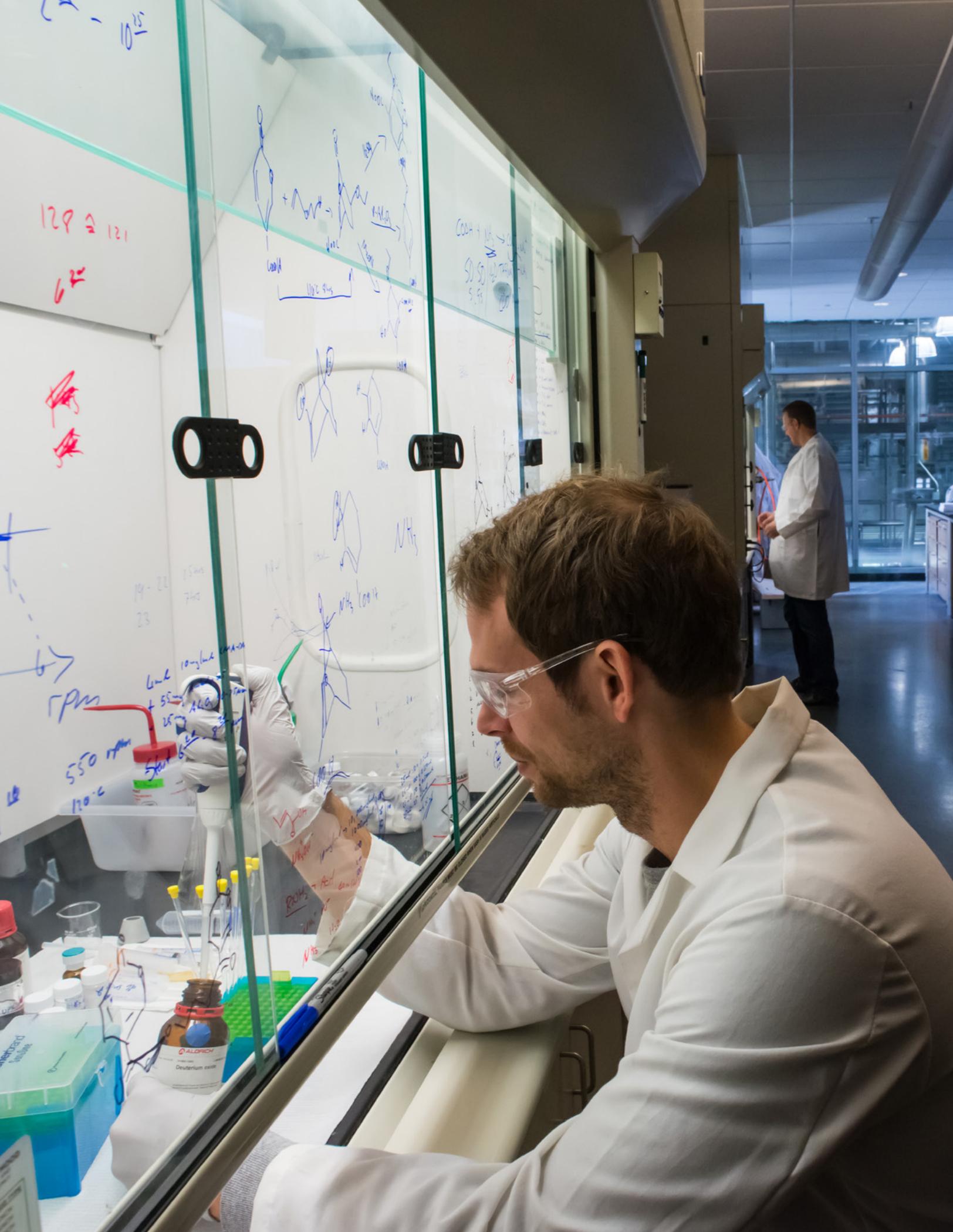
The InnoVenture Iowa Fund is an evergreen venture capital fund, built for Iowa entrepreneurs and focused on supporting companies founded, headquartered or have significant operations in Iowa. Broadly, investments by the InnoVenture Iowa Fund represent between 10-25% of startup fundraising rounds, spanning from \$250k to \$2 million. Companies seeking investment funding from InnoVenture Iowa are primarily focused in bioscience, advanced manufacturing or information technology and must provide a signed term sheet from a lead investor for consideration by the InnoVenture Iowa Investment Committee.

2022 featured several "firsts" for the InnoVenture Iowa Fund:

- Kaylee Williams joined the InnoVenture Iowa Fund as the first Investment Director. Kaylee is responsible for identifying, qualifying and providing investment recommendations to the InnoVenture Iowa Investment Committee. Kaylee is an entrepreneur and business strategist for early-stage startup companies. She graduated from the University of Iowa and is the recipient of the 2022 Young Alumni Entrepreneurial Leadership Award from the University of Iowa.
- The first InnoVenture Iowa Investment Committee members were appointed:
 - **Martina Bockenstedt** is the Vice President of Operations at Engineering Services and Products Co. and lives in Dyersville.
 - **Dan Cosgrove** is a Venture Partner with Radicle Growth and lives in Urbandale.
 - **Shane Larson** is the CEO of Inseer and formerly the Commercial Development Director of Berkshire Hathaway Energy Investment Group and lives in Des Moines.
 - **Anita Norian** is President of GW Nutrition and founder of Norian Consulting and is from Des Moines.
 - **Leigh Parker** was Vice President of Avionics Engineering and Technology with Collins Aerospace and is currently a business consultant and lives in Cedar Rapids.
 - **Tom Trone** is a retired owner/entrepreneur in business-to-consumer and business-to-business commercial markets and formerly held executive roles in business development and commercial operations for a Fortune 100 company and lives in the Quad Cities.



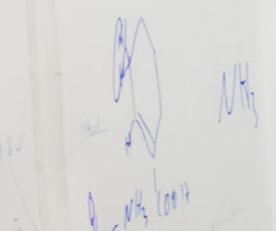
- **Hawkeye Surgical Lighting** won the inaugural InnoVenture Challenge pitch competition in December. Co-founders David Christianson and Anthony Piscopo and Chief Operating Officer Manny Ray accepted the \$100,000 prize for the world's first voice- and motion-controlled surgical headlight that integrates with an iOS app through Bluetooth. Piscopo is also a member of the first University of Iowa Innovation Leadership Fellows program sponsored by the University of Iowa's Chief Innovation Officer, Jon Darsee. Hawkeye Surgical Lighting was named Student Startup of the Year in 2021 by the University of Iowa John Pappajohn Entrepreneurial Center.
- **Distynct** received the first investment from the InnoVenture Iowa Fund in December 2022. Distynct is a precision livestock platform enabling remote management of livestock facilities using IoT sensors and smart devices.
- Other startups who received funding in the December round included:
 - **The Hummingbirds**, a platform helping small businesses find and work with hyper-local content creators to drive awareness and sales, and
 - **Clayton Farms**, a year-round subscription-based service delivering fresh produce to consumers within hours of harvest.



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ALDRICH
Deuterium oxide

IOWA GO-TO-MARKET (G2M) PROGRAM

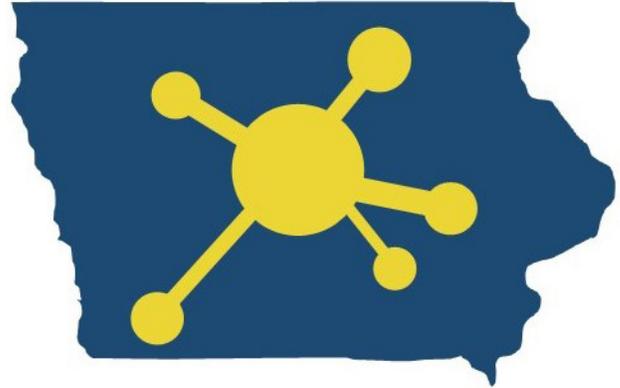
The Iowa Go-To-Market (G2M) program, funded through a grant from the US Economic Development Administration as part of its Build To Scale program, was launched in 2021. The Iowa G2M Accelerator is managed and supported by BioConnect Iowa, ISU Startup Factory and VentureNet Iowa.

The G2M Accelerator program is designed to support Iowa companies developing innovative, technology-driven products or services that have participated in another incubator, accelerator, or business assistance program and can benefit from focused, customized guidance getting to market. Entrepreneurs receive one-on-one mentoring and pro bono business support and participate in group workshops specifically designed to meet their needs at this critical juncture. Areas of focus include law, finance, corporate development, branding, marketing, human resources and facilitating connections with support services and providers across Iowa.

In 2022, two cohorts completed the program. Participating companies included:

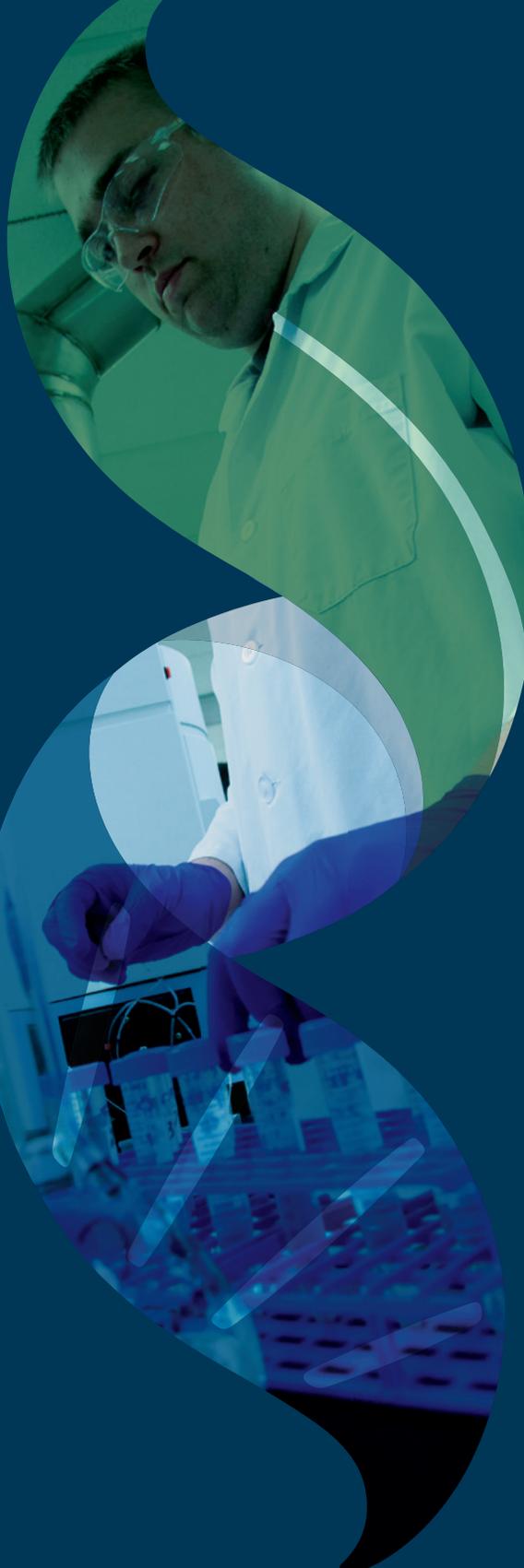
- **Janas Materials (Ames)** — Janas Materials is developing sustainable technology for the coating industry, including a type of additive that can improve color consistency and ease of application of commercial water-based wood stains.
- **NanoSpy, Inc. (Ames)** — NanoSpy develops a rapid detection biosensor platform with applications in food tech, ag tech and animal/human health.
- **Zymosense, Inc. (Ames)** — Zymosense enables rapid and accurate enzyme characterization for researchers discovering next-generation biocatalysts in pharmaceuticals, food and agriculture.
- **Hexcrete (Ames)** — Hexcrete makes harvesting wind energy possible where the demand is high by mounting towers on a universal platform, increasing their hub height, reducing the cost of energy for wind farm developers and consumers.

- **eLegalls (Ames)** — eLegalls automates case assessment and case research for lawyers and equips them with legal analytics to solve their challenges in seconds.
- **Farmers and Robots (Dubuque)** — Farmers and Robots aims to expand the production of food for human consumption in the Midwest by making advanced automation affordable and accessible to family farms.



HIGHTECH CONNECT IOWA LAUNCH

HighTech Connect Iowa is an online guide connecting 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 BioConnect Iowa in partnership with IASourceLink (a partnership between IEDA and the University of Northern Iowa), Pitchly, and VentureNet Iowa, was launched in 2021. For public resources, HighTech Connect Iowa directs users to content on IASourceLink. For private resources, users are connected directly to each resource's website.



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