LIFE SCIENCES IN DELAWARE

MOMENTUM + OPPORTUNITY

DelawareBio
ADVANCING BIOSCIENCE INNOVATION

DELAWARE PROSPERITY PARTNERSHIP

TABLE OF

CONTENTS

A joint report from the Delaware BioScience Association
and the Delaware Prosperity Partnership

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LIFE SCIENCES IN DELAWARE

The momentum of Delaware's life sciences sector has never been greater. From established global leaders to fast-growing companies to scores of smaller startups, the state's life sciences community is thriving, developing and delivering innovative medicines, devices, and technologies to address everything from the Covid-19 pandemic to hard-to-treat cancers and sustainable farming practices. This growth has been fueled by Delaware's rich scientific heritage, one of the world's best regional talent pools, an increasingly diverse range of firms, and a collaborative, supportive network of industry, higher education, and government.

Within a period of days this summer, two significant events underlined the state's unique position for global leadership in the sector.

First was the announcement of a several hundred-million-dollar-investment in a new pharmaceutical development and manufacturing facility in Middletown. The operation will employ nearly 500 in the initial phase and could employ more than 1,000 workers in a few years, across roles ranging from manufacturing to management to administration. The second was news that NIIMBL—the National Institute for Innovation in Manufacturing Biopharmaceuticals, based at the University of Delaware's STAR Campus—will receive $153 million from the U.S. Department of Commerce to advance its mission of driving innovation in domestic biopharmaceutical manufacturing by developing flexible, agile, and cost-effective manufacturing processes.

These major developments—along with plans for hundreds of millions to be invested in a science and innovation park at the former DuPont Chestnut Run site, a new $10 million program supporting the expansion of lab space, the launch of a legislative Life Science Caucus in the General Assembly, and one of the market's most successful IPOs of the last year by a local biotech—send a clear signal that the life sciences will drive Delaware's economic future while delivering immense value to patients and public health.

In recent years, national organizations have periodically attempted to measure aspects of the life sciences landscape in Delaware, but there has been no comprehensive effort to capture the full vitality, breadth, impact, and opportunity for the state. The Delaware BioScience Association (Delaware Bio) and the Delaware Prosperity Partnership (DPP) have partnered to produce this baseline report on Delaware's life sciences sector to assess and frame the industry's size and importance; inform key stakeholders within and outside Delaware about the diversity and evolution of the state's bioscience sector; and identify priority opportunities to continue to grow a sector so vital to Delaware's future.

EXECUTIVE SUMMARY

Delaware, with unique strengths and distinct advantages as part of a thriving Mid-Atlantic region, is ideally positioned to seize a coming wave of opportunities in the life sciences sector into the next decade and beyond.

Bioscience is a leading economic driver in Delaware, with the state poised for significant growth

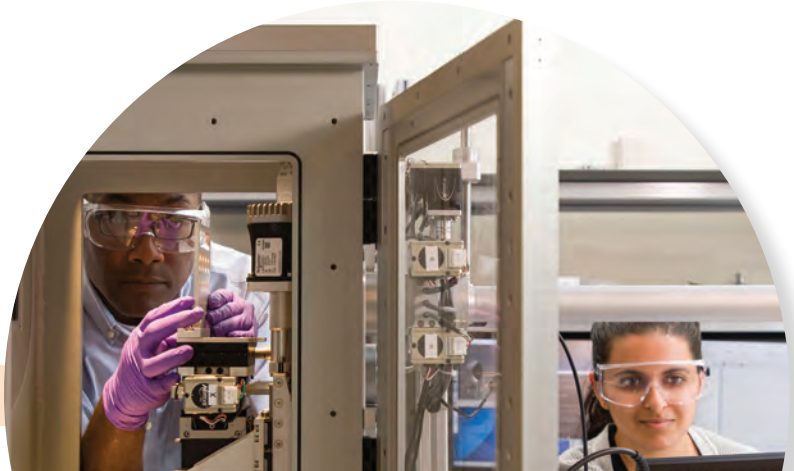
- Delaware's life sciences sector employs approximately 11,000 people (2.5% of total state employment) and directly generates at least $2 billion in GDP annually (2.5% of total state GDP)
- Life sciences employers in Delaware generate annual payrolls of at least $230 million
- There has been a significant, sustained growth in interest from life sciences companies in expanding in or moving to Delaware, validated by the decision of WuXi STA to build a new $510M, 500 employee biopharmaceutical production facility with opportunity for growth

There has never been a moment when the value of bioscientific innovation has been more apparent

- The Covid-19 pandemic has made clear the industry's immense value and urgent work
- Nationally, employment in the sector reached a record high in 1Q21, up 16% in four years
- Venture capital investment soared throughout 2020, and in the first quarter of 2021 alone totaled approximately $10 billion, easily the largest quarterly total in the past 25 years

Delaware sits in the heart of the Mid-Atlantic region, with distinct business advantages—yet has room to strengthen its visibility and identity

- Nearly 30% of all biochemists and biophysicists in the U.S. are employed in DE, MD, NJ, and PA, while one out of six U.S. pharmaceutical employees works in the greater Mid-Atlantic region
- Forbes' "Best States for Business Rankings" ranks Delaware 2nd-best for business costs in the nation, while the state has the 6th-lowest property taxes nationally
- Delaware ranks 3rd nationally for overall corporate tax favorability
- Delaware has the 4th-highest concentration of employed PhDs in health, science, and engineering, and ranked 9th in the Milken Institute's 2020 State Technology and Science Index



The composition of Delaware's bioscience landscape has been transformed in recent years, with increased depth and diversity across the sector

- The number of life sciences establishments in Delaware has grown significantly in the past decade, most notably in the biotechnology R&D subindustry with an increase of 65%
- Fast-growth startups like Prelude Therapeutics and Nikang Therapeutics have each raised hundreds of millions of dollars in venture capital, while mid-sized firms like Frontier Scientific Services and QPS have grown rapidly in recent years
- Industry stalwarts such as Incyte and Gore, from which scientists have gone on to found their own companies in Delaware, are thriving and expansions at Air Liquide, the formation of Corteva, and FMC's Delaware entry add agricultural and industrial bioscience depth

Delaware draws on a world class talent pool in the state and regional labor market

- The Philadelphia-Camden-Wilmington metro area—which includes northern Delaware—ranks 4th in life sciences employment nationally, with Delaware employers drawing approximately one out of five life scientists employed in Delaware from across state lines
- More than one-third of all Philadelphia metro area chemical engineers work in New Castle County, although New Castle County accounts for just 9% of the total metro population
- More than 109,000 people in the region hold a terminal degree in biological, agricultural, and environmental sciences, or 6.6% of all degree-holders—a rate on par with Greater Boston

The state is home to a wide range of degree and training programs to develop the future talent pipeline, and institutions are innovating to respond to employer demand

- The number of associate degrees or higher in life sciences disciplines awarded by Delaware institutions has grown by 64% since 2010
- University of Delaware (UD) programs span all life sciences disciplines from general biology, to plant science, to marine biosciences, and medical laboratory sciences, while Delaware State University (DSU) has programs in agriculture, general biology, natural resources management, and neuroscience
- Delaware Technical Community College (DTCC) and Wilmington University also provide critical support for the life sciences talent pipeline, from specific, tailored training to continuing education
- Innovative collaborations are blooming such as ChristianaCare's Gene Editing Institute and DTCC's partnership to develop the first-ever gene editing curriculum for community college students in 2017

Companies in the state are supported by a collaborative ecosystem driven by private and public activity

- The National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) recently opened a $156 million, 200,000 square-foot building at UD, for R&D and biopharmaceutical workforce training
- Multiple organizations actively support the sector's growth, including Delaware BioScience Association, Delaware IDeA Network of Biomedical Research Excellence, Delaware Manufacturing Extension Partnership, Optical Science Center for Applied Research at DSU, Delaware Technology Park, Delaware Innovation Space, and more
- A new graduated lab space fund is already eagerly being tapped, with $10 million in FY2022 to incentivize lab construction for small to medium sized companies to grow in Delaware

Delaware's academic institutions are key drivers of innovation and research in the state's life sciences ecosystem, with substantial R&D expenditures

- Most of the state's academic R&D is conducted at UD with more than $200 million in 2019, with about one-third ($60.5 million) devoted to life sciences-related research
- UD's chemical engineering R&D expenditures are more than seven times greater than other institutions in the region on a per capita basis
- DSU's R&D spend was $23 million in 2019, with a higher share focused on life sciences-related research (about 60%, or $13.8 million)
- Delaware life sciences R&D expenditures are tilted more heavily toward agricultural sciences than in neighboring states—a fact owing to Delaware's agricultural legacy, but also the absence of a medical school which tend to account for an outsize share of life sciences R&D

The growth in federal funding for Delaware institutions undergirds the scale of R&D activity in the state

- UD ranks among the top 10% nationally for National Science Foundation R&D expenditures, while DSU ranks 5th among HBCUs for R&D expenditures
- Since 2000, Delaware's R&D funding from the National Institutes of Health, as a share of overall NIH R&D allocation, has more than doubled to $58 million in 2020
- Delaware is among the top three recipients, on a per capita basis, of funding from NIH Institutional Development Award (IDeA) program

Still, private industry and venture capital are key drivers in the state's life sciences growth

- Delaware ranks 8th nationally in bioscience-related patents per capita, supported by UD's Office of Economic Innovation and Partnerships (OEIP) and the state's deep bench of IP experts
- Delaware ranked 7th nationally for life sciences venture capital funding per capita between 2016 and 2019—outpacing PA, MD, and NJ—as investment grew from $22.2 million in 2017 to $111.4 million in 2018 and $123.9 million in 2019, driven largely by investments in Prelude Therapeutics

Delaware has several strategic opportunities to accelerate growth in life sciences.

To ensure and accelerate the sector's continued success, industry, higher education, and state leaders must focus on strategic investments in workforce development, lab space supply, industry/higher education collaboration, and access to capital.

DELAWARE'S LIFE SCIENCES OPPORTUNITY

Bioscience is a leading economic driver in Delaware, with the state poised for significant growth

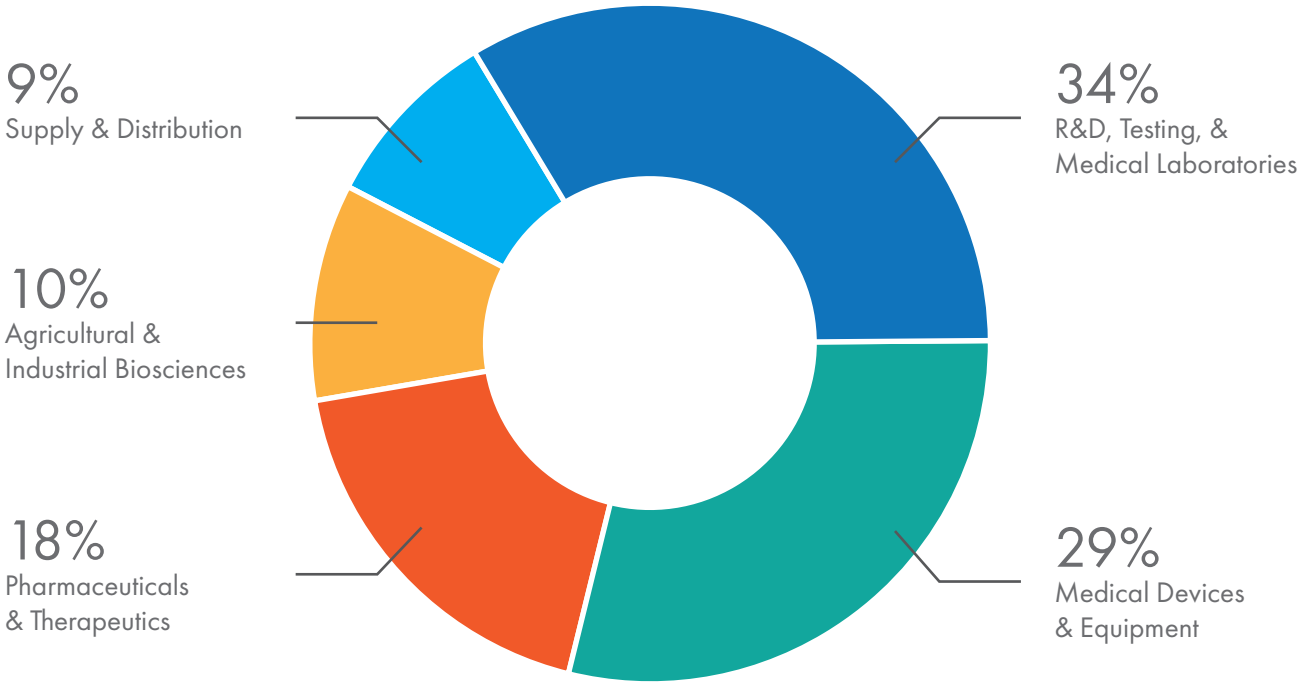
Delaware, with unique strengths and distinct advantages as part of a thriving region, is ideally positioned to seize a coming wave of opportunities in the life sciences sector into the next decade and beyond.

Delaware's life sciences sector employs approximately 11,000 people and directly generates at least $2 billion in GDP annually, accounting for 2.5% of total state employment and GDP, respectively.[1] Life sciences employers in Delaware generate annual payrolls of at least $230 million and create high-quality jobs across a wide range of occupations, not only for PhD scientists and manufacturing operators, but positions in sales and marketing, administration, IT, facilities, and the full complement of talent required by businesses.[2] In 2020, real-time job posting data indicated that while 18% of job openings required an advanced degree, 66% required a bachelor's degree and 16% were available to individuals with less than a bachelor's degree.[3] New investment in manufacturing facilities will provide significantly more opportunities for trained non-degree employees.

The sector is deeply diversified, with substantial concentration of activity in Pharmaceuticals & Therapeutics; R&D, Testing, & Medical Laboratories; and Medical Devices & Equipment, along with several major companies in the Agricultural & Industrial Bioscience segment (see Figure 1 & "Defining the Life Sciences Sector").

Figure 1.

Delaware Life Sciences Employment by Subsector, 2020



Source: U.S. Bureau of Labor Statistics; DPP analysis

Global companies such as AstraZeneca, Incyte, Gore, Siemens, FMC, Prelude Therapeutics, and Agilent are based in Delaware or have significant operations in the state. The sector is supported by a deep talent pool, drawing on talent and research at the University of Delaware (UD), Delaware State University (DSU), and Delaware Technical Community College (DTCC), as well as world class institutions of higher education throughout the region like the University of Pennsylvania, Johns Hopkins University, Drexel University, and more.

The increase in bioscience companies considering Delaware as a place to locate or expand has been a particularly notable development. The Delaware Prosperity Partnership, the state's lead economic development organization, received and managed inquiries from 15 prospective companies in the life sciences sector in 2020, up from 11 in 2019 and 2018. Over that three-year period, DPP successfully supported the location or expansion of six of those prospects in Delaware.[4]

While each of these point to Delaware's strength in the sector, the decision in the summer of 2021 by WuXi STA—a leading contract development and manufacturing organization (CDMO)—to build its first major U.S. production facility in Middletown, DE is a significant milestone for the state's bioscience sector. In the initial phase of the project, the company will invest more than $500 million to build a 600,000 square foot biopharmaceutical manufacturing facility, employing nearly 500 people with potential for significant additional investment and long-term job creation. Development of the facility will support hundreds of construction jobs and generate millions of dollars annually in tax revenue. The company will manufacture drug substances and drug products for leading global customers, and the addition of significant manufacturing capacity in the state will further establish Delaware as a preferred location for both biopharmaceutical R&D and manufacturing.

WuXi's decision to invest hundreds of millions of dollars in Delaware speaks to the state's heritage and current strength in advanced manufacturing and chemical processing along with a broader push to domesticate the manufacturing of essential products. The company will be joining other growing contract manufacturers, such as Adesis, Wilmington PharmaTech, and Sepax, with unique scientific expertise and experience serving major global pharmaceutical leaders.

DEFINING THE LIFE SCIENCES SECTOR

Because there is no formal definition of the life sciences sector in the North American Industry Classification System (NAICS), many organizations and reports have developed a range of classifications to capture bioscience activity in the economy. Most of these include core industries like pharmaceutical production, research and development, medical devices, and agricultural bioscience. Some include related wholesale and distribution, while fewer still include some portion of university and healthcare activity.

The framework used for this report begins with a baseline structure inspired by several of these prior studies, with five component subsectors that capture the breadth of bioscience activity: Pharmaceuticals & Therapeutics; R&D, Testing, & Medical Laboratories; Agricultural & Industrial Biosciences; Medical Devices & Equipment; and Supply & Distribution (see Figure 2 on p. 12). Like other reports, this report uses industry employment data, rather than occupational employment data, so life sciences employment includes not only life scientists, but employees in sales and marketing, administration, IT, facilities, and the full complement of talent required by life sciences companies. In addition to drawing on past research, these subsectors are also tailored with an on-the-ground assessment of key local drivers (for instance, R&D in this report includes a portion of university and healthcare activity, given the contributions of those industries to the overall sector in Delaware).

However, even the most carefully constructed definitions using NAICS codes can end up failing to capture activity at companies that would seem to fit the definition, but for myriad reasons are captured in the government data under a different NAICS code (e.g., a company that has several verticals, or a company that is captured as a headquarters in a certain location rather than in the functional industry). This can be particularly problematic for a smaller state like Delaware, where a definition that inadvertently excludes a few large companies can have a significant impact on employment figures. Further research was conducted to fill in some of these gaps where possible and appropriate.

There has never been a moment when the value of bioscientific innovation has been more apparent

While the world has long depended on the bioscience sector to deliver life-saving drugs, vaccines, and medical devices, the Covid-19 pandemic made clear the immense importance and urgency of the work of researchers and manufacturers of life science innovation. The virus' devastating impact on human life, healthcare systems, and the rapid shutdown of the global economy sparked a renewed understanding of the paramount role the bioscience sector plays in ensuring our health and way of life. This global realization has been particularly clear in Delaware, where companies of all sizes and types played leading roles in the development and production of everything from Covid vaccines, therapeutics, and diagnostics to protective gear for first-line responders.

Rapid vaccine development has demonstrated some of the cutting-edge research and compositional changes in the industry that have been underway for some time, but now in a way that is more easily observable. For example, industry titans like Pfizer, AstraZeneca, and Johnson & Johnson have been critical in the response, but the emergence of smaller, newer firms like Moderna and BioNTech has demonstrated the increasing depth of the industry.

The overall growth trajectory in this industry is phenomenal. Nationally, life sciences employment reached a record high in the first quarter of 2021, and employment has grown by 16% during the past four years.[5] In biotech alone, there were 78 initial public offerings in 2020 with a collective IPO raise of $12 billion.[6] Venture capital (VC) investment soared throughout 2020, and in the first quarter of 2021 alone totaled approximately $10 billion, easily the largest quarterly total in the past 25 years.[7] While nearly every region would like to capture a share of this activity, there are a relatively limited set of markets outside of the leading hubs of Boston, San Francisco, and San Diego that have the depth of existing companies, talent, and university research, as well as competitive cost structures and other business considerations that provide a compelling value proposition for companies deciding where to grow and invest. Delaware is one.

Delaware sits in the heart of the Mid-Atlantic region, with distinct business advantages—yet has room to strengthen its visibility and identity

Strategically located between New York and Washington, D.C., Delaware is at the heart of the country's largest consumer market and one of the most robust life sciences clusters in the United States, stretching from New Jersey to Pennsylvania and Maryland. Nearly 30% of all biochemists and biophysicists in the United States are employed in Delaware, Maryland, New Jersey, and Pennsylvania, and one out of six U.S. pharmaceutical employees works in the Mid-Atlantic region.[8] In the Philadelphia-Camden-Wilmington metropolitan area—the nation's 7th-largest metropolitan area

and the commutable labor pool for companies located in Northern Delaware—there are nearly 5,000 biomedical engineers, biochemists, biophysicists, and chemists.[9]

Delaware has the 4th-highest concentration of employed PhDs in health, science and engineering.[10] Delaware ranked 9th in the Milken Institute's 2020 State Technology and Science Index, which evaluates each U.S. state based on its science and technology ecosystem. As the life sciences labor market in places such as Boston continues to tighten, restricting industry growth, Delaware can offer a highly-skilled workforce that is more cost-competitive and accessible. And for life science enterprises, Delaware's proximity to the greater Washington, D.C. region provides a critical advantage to reach and engage with key government agencies, stakeholders, and funders—including the Food and Drug Administration (FDA) and National Institutes of Health (NIH).

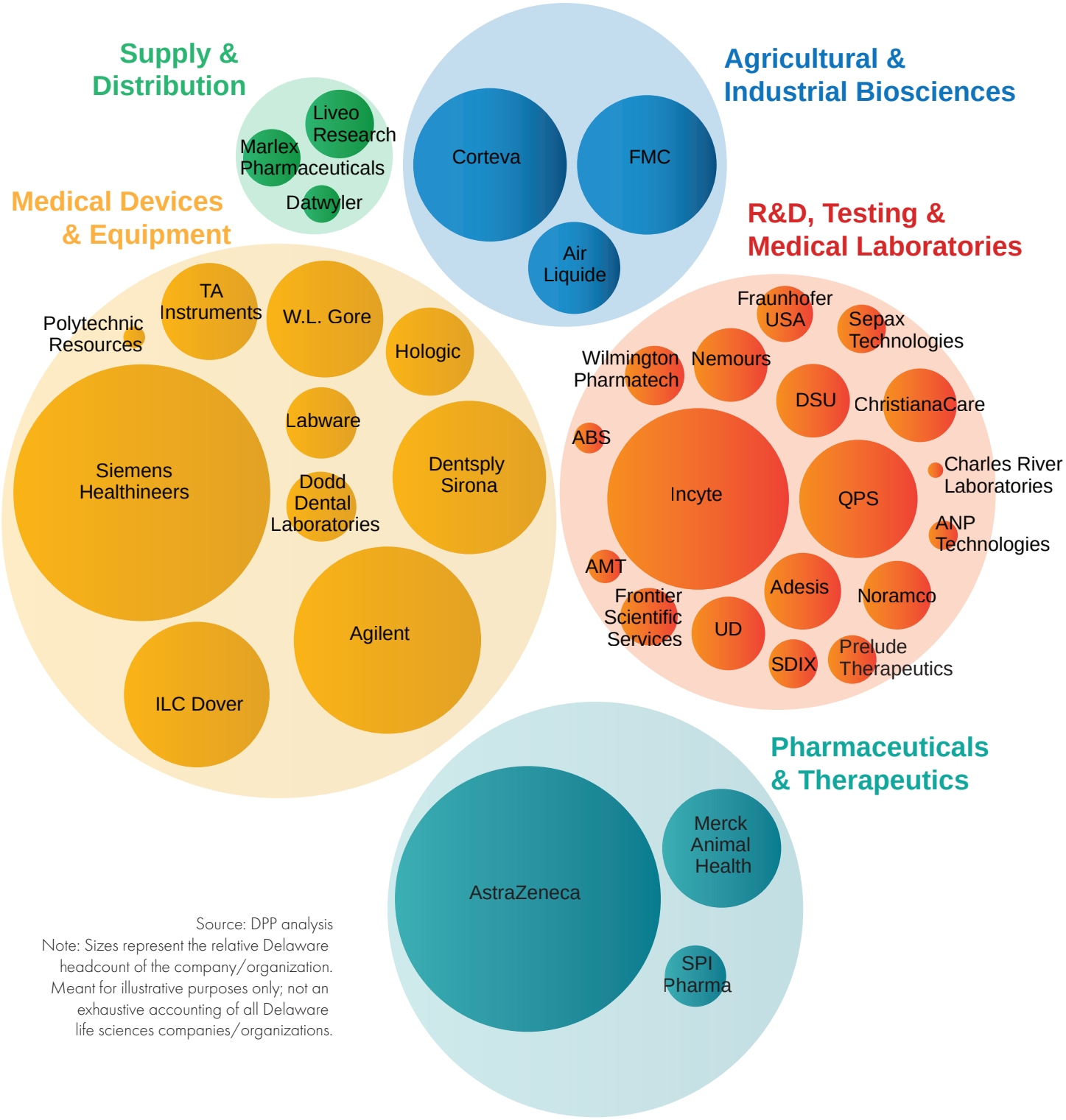
Companies doing business in Delaware have the best of both worlds. They can access talented workers across Delaware, Pennsylvania, New Jersey, and Maryland, but by locating in Delaware enjoy the lowest costs of doing business in the entire northeastern United States. Forbes' "Best States for Business List" has recognized that Delaware ranks 2nd-lowest for business costs in the nation.[11] And a recent report released by the Tax Foundation and KPMG found Delaware to rank 2nd for overall corporate tax favorability for new firms and 3rd for overall corporate tax favorability for mature firms.[12] The state has no sales tax, and Delaware's property taxes are also much lower than the rest of the region, ranking among the lowest across the United States. In fact, while most northeastern states rank among the top 20 states for highest property taxes, Delaware has the 6th-lowest property taxes nationally.[13] Companies that choose to incorporate in Delaware join the more than two-thirds of Fortune 500 companies that have incorporated in the First State—not to mention the 89% of U.S. companies that filed for initial public offerings in 2019, according to the Delaware Division of Corporations—owing to the state's well-developed case law built over two-hundred years and highly-respected judicial and legal community.

Despite these advantages, Delaware does not always garner the same visibility nationally as other parts of the region, whether it is New Jersey's position as a historical pharmaceutical hub, Maryland's synergy with federal institutes and investment, or Philadelphia's rise as "Cellicon Valley." Without the megaphone of its own distinct major media market, it will be incumbent on leaders throughout Delaware to better define and tell the story of the state's diverse and dynamic life sciences sector—which is very much a part of the regional life sciences cluster yet offers a unique, compelling value proposition of its own with many of the key assets in place for explosive growth. Telling that story effectively requires a comprehensive understanding of the current environment. What is the landscape of companies, talent, and supportive infrastructure that undergirds the life sciences in Delaware? How does the state fare in terms of innovation and investment, and how do the contours of that compare with other states? What are the strategic opportunities that the state has to capitalize on existing momentum and reduce barriers to growth?

COMPANIES, TALENT & SUPPORT ECOSYSTEM

Figure 2.

Delaware's Life Sciences Landscape by Subsector



Source: DPP analysis
Note: Sizes represent the relative Delaware headcount of the company/organization. Meant for illustrative purposes only; not an exhaustive accounting of all Delaware life sciences companies/organizations.

The composition of Delaware's bioscience landscape has been transformed in recent years, with increased depth and diversity across the sector

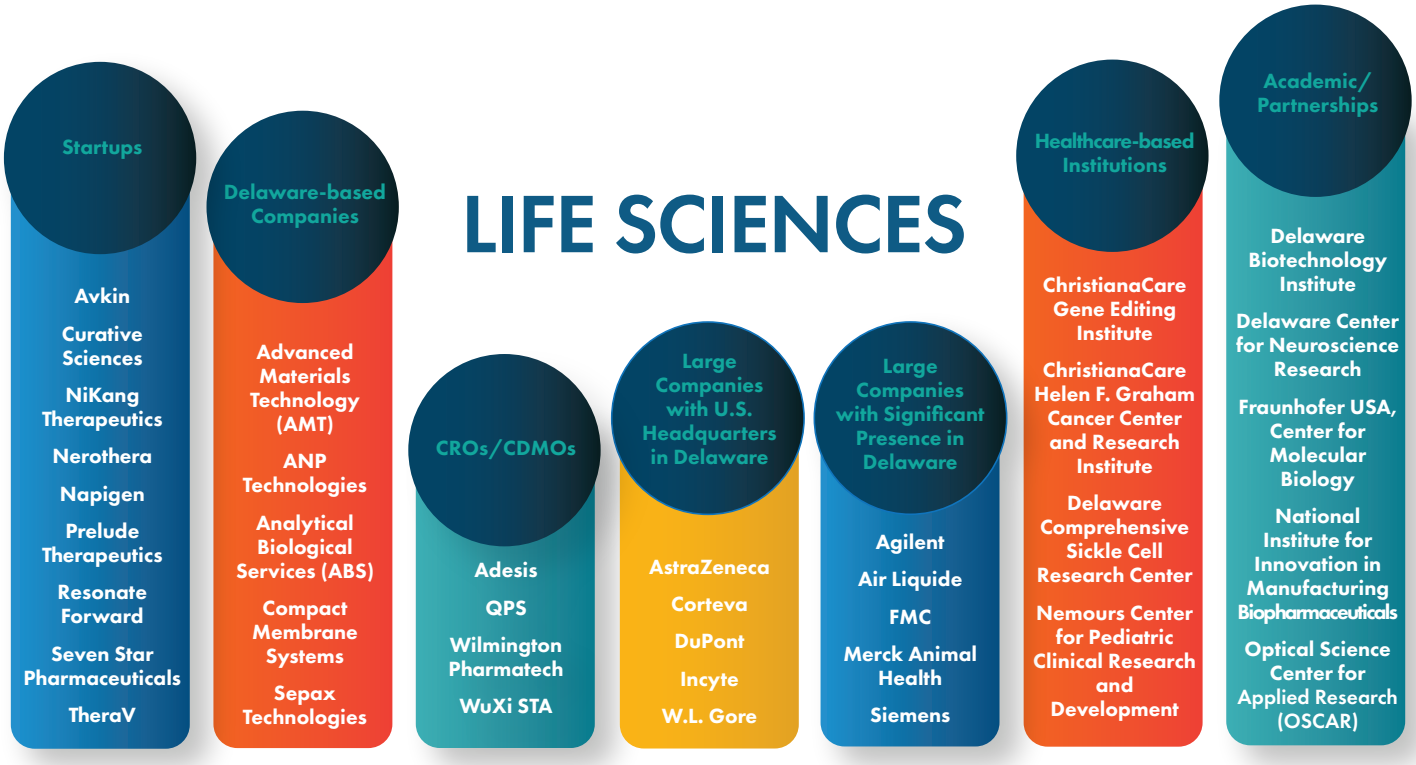
In line with broader industry trends, Delaware's life sciences sector has experienced a significant transition from an environment dominated by large, established companies to one with a much wider mix of established, startup, and growth companies across segments (see Figures 2 and 3). Two decades ago, companies like Incyte and Agilent entered the Delaware market, breathing new vibrancy into the local ecosystem. The changing landscape of the 1990s and 2000s, however, was only a precursor for what has happened over the past decade, in which the number of life sciences establishments in Delaware has grown significantly, most notably in the biotechnology R&D subindustry with an increase of 65%.[14]

Companies like Prelude Therapeutics and Nikang Therapeutics, two of the most visible early stage firms both focused on cancer medicines, have each raised hundreds of millions of dollars in venture capital, while several contract research organizations (CROs) and Contract Development Manufacturing Organizations (CDMOs) have flourished. Mid-sized firms like Frontier Scientific Services and QPS have grown rapidly in recent years. And at the same time, expansions of companies like Air Liquide at its innovation campus in Newark, the formation of Corteva as a spinoff of DuPont, and FMC's entry into the Delaware market have added to the depth of companies tackling a broader spectrum of agricultural and industrial bioscience applications. At education and healthcare institutions, the University of Delaware and Delaware State University have grown their life sciences research considerably, while ChristianaCare launched the cutting-edge Gene Editing Institute in 2015.

While the sector has changed significantly in recent years, there are clear throughlines from past to present in terms of the state's scientific legacy that has helped position Delaware as an attractive destination for life sciences activity. In the 1950s, a DuPont scientist founded W.L. Gore to expand the use of a DuPont discovery, which has evolved into a leading medical device technology used in stents

Figure 3.

Delaware's Life Sciences Landscape by Type



Source: DPP analysis

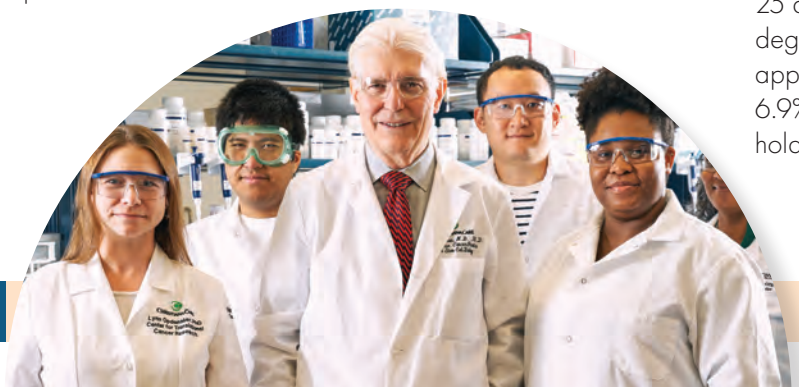
Note: Meant for illustrative purposes only; not an exhaustive accounting of all Delaware life sciences companies/organizations.

today (and Gore remains a key presence in the state's life sciences ecosystem). When Incyte moved to Delaware in 2002, it brought on a core group of researchers from DuPont and even leased space at DuPont's Experimental Station. Former DuPont scientists went on to establish QPS, a CRO that has grown to more than 250 employees in Delaware and 1,200 worldwide; ANP Technologies, an emerging biotechnology company originally spun out of the U.S. Army Research Laboratory in 2002; SDIX, a drug testing company in Newark; and Wilmington Pharmatech, another CRO with significant recent growth.

Since consolidating its newly merged operations in Delaware in the 1990s, AstraZeneca continues to remain a significant anchor in the local ecosystem. And similar to DuPont's impact in terms of its former scientists spawning new startups and innovation in the state, Incyte is beginning to play a similar role as it becomes a more established anchor in the Delaware life sciences ecosystem, with former Incyte scientists going on to found the aforementioned Prelude Therapeutics and NiKang Therapeutics.

Delaware draws on a world class talent pool in the state and regional labor market

Delaware sits within one of the largest life sciences hubs in the nation. Cushman & Wakefield reports that the Philadelphia-Camden-Wilmington metro area—which includes northern Delaware—ranks 4th in current life sciences employment, just behind the major life sciences markets of Boston, San Francisco, and San Diego.[15] The report also examines the potential life sciences talent pool by identifying 18 occupations that have skills that can be used in life sciences (e.g., chemical engineers, conservation scientists, chemists, etc.). For this categorization, Philadelphia ranked 3rd in the nation, with Delaware's specialty in the chemicals sector being a significant contributing factor (see "The Advantage of Delaware's Expertise in Advanced Chemicals"). More than one-third of all Philadelphia metro area chemical engineers work in New Castle County, despite the fact that New Castle County accounts for just 9% of the total metro area population.[16]



THE ADVANTAGE OF DELAWARE'S EXPERTISE IN ADVANCED CHEMICALS

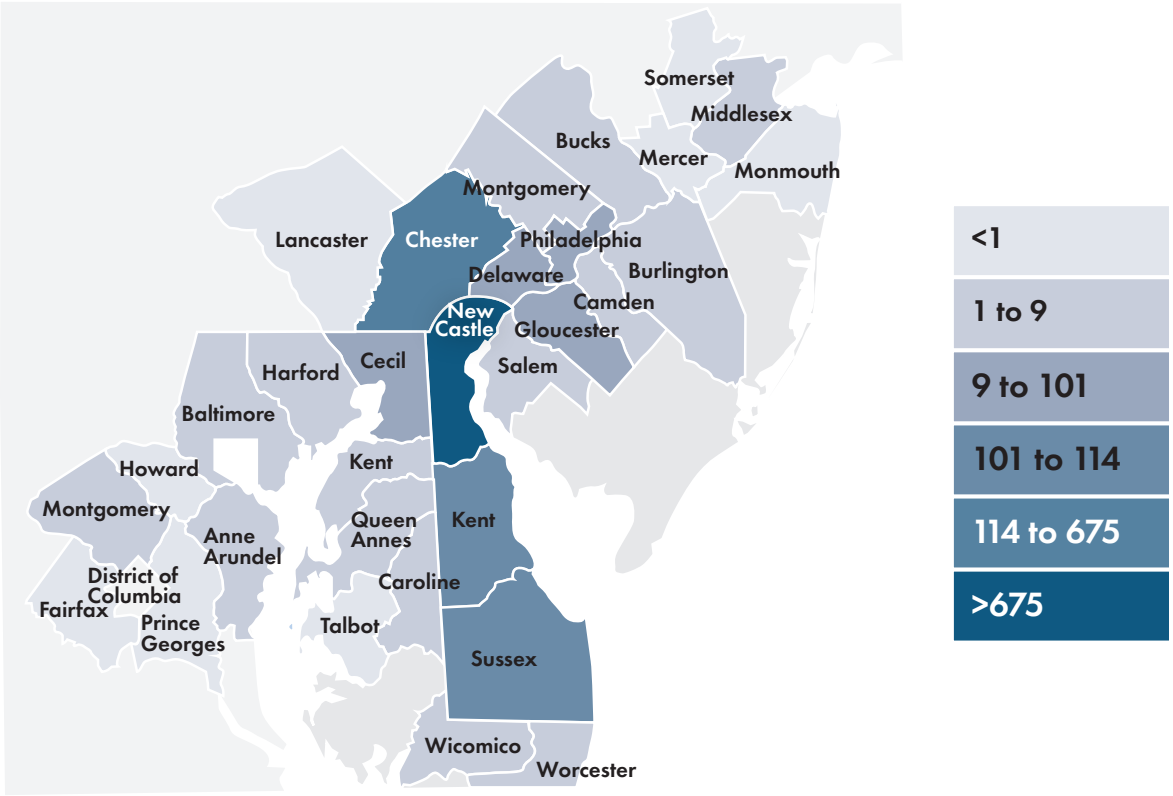
The impact that DuPont scientists have had in creating new bioscience companies in Delaware is evidence of the synergy between advanced chemicals and life sciences, and recent hiring trends provide further illustration of this connection. According to real-time job posting data from labor analytics firm Chmura, chemistry was the top listed hard skill required for life scientist job openings in Delaware in the past year, while the top two programs of study required for life scientist positions were biology and chemistry, respectively.

Delaware has a distinct competitive advantage with the depth of its chemistry talent pool. The First State has the highest concentration of chemists in the country—approximately four times the national average, according to analysis of occupational employment data from the U.S. Bureau of Labor Statistics. Beyond existing talent, the University of Delaware has a strong pipeline with a chemical engineering program ranked 8th in the nation in 2021 according to U.S. News & World Report. Students receive a state-of-the art education and access to robustly funded chemical engineering R&D. In 2019, the University of Delaware spent approximately $36.87 million on chemical engineering R&D, which is almost 18% of the university's total R&D expenditures.

With access to graduates from top medical schools and research institutions in the region, including a leading Historically Black College and University (HBCU), Delaware companies draw from a vast and diverse talent pool. The surrounding institutions of higher education, including the University of Pennsylvania, Johns Hopkins University, Delaware State University, and the University of Delaware, among many others, support a talent pool that is on par with established life sciences hubs, such as Boston. In 2019, the Philadelphia metro area was home to more than 109,000 individuals with a bachelor's degree or higher in biological, agricultural, and environmental sciences or 6.6% of all individuals aged 25 and older in the region who hold at least a bachelor's degree.[17] In comparison, the Boston metro area was home to approximately 117,000 individuals with similar credentials or 6.9% of all individuals aged 25 and older in the region who hold at least a bachelor's degree.[18]

Figure 4.

Life Scientists Employed in Delaware and Where They Live, 2021



Source: Chmura JobsEQ ERSI, 2021Q1

This regional talent pool across the Delaware Valley is a boon for Delaware companies, who are able to tap a much wider labor pool than exists only within the state's borders. In fact, approximately one out of five (21%) life scientists employed in Delaware reside outside of the state, most predominantly in Chester, Delaware, and Philadelphia County (see Figure 4).

The state is home to a wide range of degree and training programs to develop the future talent pipeline

Driven by rapid expansion of life sciences programs, the combined number of two-year, four-year, and graduate degrees awarded by Delaware higher education institutions has grown steadily since 2010. Across all fields of study, the number of those degrees awarded in Delaware has increased by 20%; however, the number of degrees in life sciences disciplines has expanded by 64%, rising from 562 degrees awarded in 2010 to 921 in 2019. Examples of programs relevant to typical life sciences occupations include general biology, anatomy, bioinformatics, neuroscience, agricultural sciences, animal sciences, and environmental sciences.[19]

Within the state, the University of Delaware is the largest source of life sciences talent, granting 605 of the 921 degrees in 2019. The programs span all disciplines from general biology at the College of Arts & Sciences; to plant science at the College of Agriculture & Natural Resources; to marine biosciences at the College of Earth, Ocean, & Environment; and medical laboratory sciences at the College of Health Sciences. The largest program is general biological studies with more than 160 graduates in 2019.

Delaware State University, Delaware Technical Community College, and Wilmington University also support the life sciences talent pipeline and have the potential for increased capacity in the future. In 2019, Delaware State University granted 83 life sciences-related awards, driven by the university's growing agriculture program and established general biology program. Other notable programs include the neuroscience PhD program, as well as undergraduate and graduate degrees in natural resources management. Delaware Technical Community College offers associate degree programs that contribute to building a robust biotechnician workforce. Graduates of the associate in bioscience and

biotechnology programs can transfer to UD or DSU to pursue a four-year biology degree or begin a career as a biotechnician in a variety of laboratory settings. Wilmington University reported more than 200 graduates in biology in 2019, and while nearly all (95%) of those were awarded online and outside of Delaware, there remains potential to target those offerings to the local workforce.

Outside of higher education, Delaware Pathways is a program designed to create a seamless talent pipeline in the state by giving high school and postsecondary students the opportunity to gain work-based learning experiences and earn early college credits in high-demand careers. The program launched in 2015 with five rapidly-expanding career paths—including biomedical science. For the 2017-2018 school year, Pathways added environmental sciences and natural resources because of growing market demand and increased student participation. Today, 23 high schools offer one of the six bioscience-related pathways.

And the state's universities and training providers are innovating to respond to employer demand, developing more specialized programs

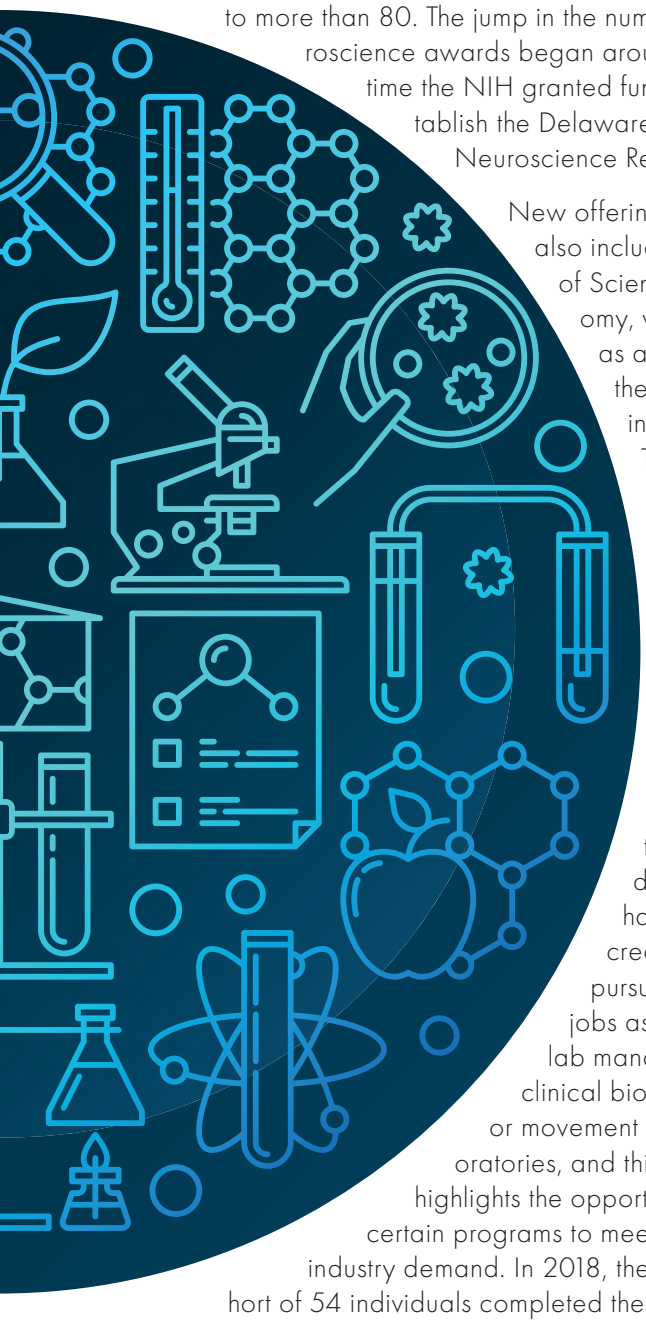
The National Academies expects 3.4 million skilled technical jobs to go unfilled across the United States by 2022, prompting universities and employers to work collaboratively to strengthen the STEM talent pipeline.[21] According to a recent life sciences industry survey, 78% of the life sciences executives interviewed report their companies participate in formal partnerships with educational institutions.[22]

In Delaware, ChristianaCare's Gene Editing Institute and Delaware Technical Community College partnered to develop the first-ever gene editing curriculum for community college students in 2017 with a $1 million NSF grant. Since then, DTCC has trained more than 70 faculty members from community colleges across the U.S. In 2020, the partnership received another $700,000 to further advance the CRISPR in a Box™ Educational Gene Editing Kit. Additionally, DTCC's nimble response to WuXi's employment needs resulted in a collaboration to develop and scale up a new operators training program that will increase the supply of bioscience talent in the state and will serve as a model for how the state and workforce partners can respond to direct employer needs.

The University of Delaware has developed several smaller programs to meet evolving employer needs. In 2010, the Center of Bioinformatics and Computation Biology launched a master's program in bioinformatics and computational biology and released plans for a doctoral program in bioinformatics and systems biology. The university also established the Bioinformatics Core Facility at the Delaware Biotechnology Institute to train future workforce and research key industry questions. In 2017, the College of Health Sciences continued to meet workforce demands by adding a program in applied molecular biology and biotechnology. In 2019, 12 students graduated with a degree related to bioinformatics, seven with degrees in biotechnology, and three with degrees related to computational biology.[23]

At the University of Delaware the largest portion of growth in life sciences degrees was driven not by traditional biology awards but by the expansion of several existing programs and the establishment of new, innovative programs. For example, existing programs offered by the

College of Earth, Ocean, and Environment scaled up in size. The number of marine biology and biological oceanography related degrees jumped from 13 in 2010 to 39 in 2019. Similarly, the number of environmental science related awards increased from 15 to 63. But the largest increase in degrees awarded was in the neuroscience program at the University of Delaware. In 2010, there were just eight graduates, but in 2019 the number of graduates increased to more than 80. The jump in the number of neuroscience awards began around the same time the NIH granted funds to establish the Delaware Center for Neuroscience Research.



New offerings at UD also include a Master of Science in Anatomy, which began as an offshoot of the Doctorate in Physical Therapy program for students who began the program but did not finish. The rationale for adding this option was that those students would have the credentials to pursue well-paid jobs as research lab managers in clinical biomechanics or movement science laboratories, and this change highlights the opportunity to pivot certain programs to meet growing industry demand. In 2018, the first cohort of 54 individuals completed the degree program. Another high-demand program, a Masters in Biopharmaceutical Sciences, launched in June 2021 fueled by support and insights from industry partners including AstraZeneca, Bristol Myers Squibb, and Merck & Co. The program will incorporate 15-month internships and align with NIIMBL located at the University of Delaware.

While some of these individual programs may seem small on their own, in aggregate they constitute a significant expansion of capacity of life sciences talent, across a spectrum of skill sets and knowledge bases that can meet varied industry needs. There is also significant value in having this wide range of programs established and running, with opportunities to scale programs more quickly as industry needs evolve.

Companies in the state are supported by a collaborative ecosystem, driven by private and public activity with opportunities for greater coordination and strategic direction

In Delaware, the public and private sector work together to invest in entrepreneurial startups, spur innovation, and secure a strong future for life sciences companies in the state. The state has attracted innovative entities like NIIMBL and has invested directly to help create lab space for growing companies and funding for early-stage startups. A robust legal system, with scientifically-trained lawyers and highly-respected courts, supports intellectual property and patenting activity. At the same time, a wide range of organizations have evolved in the state to support the growing life sciences sector in various ways and are critical to further growth (see "Supportive Ecosystem & Investments" on the next page).

SUPPORTIVE ECOSYSTEM & INVESTMENTS

NIIMBL

In 2016, Delaware's federal delegation, colleges & universities, and biopharmaceutical companies worked together to win the competitive location bid process for the 11th Manufacturing USA institute. In 2017, Manufacturing USA announced **NIIMBL** would be located at UD's STAR Campus in the Biopharmaceutical Innovation Building, a $156 million, 200,000 square-foot building featuring state-of-the-art labs and serving as a cutting-edge center for R&D and biopharmaceutical workforce training.

DE BIO

Life science companies, research institutions, and academic and economic development organizations in Delaware are connected through **Delaware Bio**, which serves as a catalyst for industry growth and collaboration.

INBRE

The Delaware **IDeA Network of Biomedical Research Excellence** is a collaborative network with the goal of expanding biomedical research activities funding in the state.

MRA

Pennsylvania-based **MRA Group** will significantly invest in the transformation of the 170 acre former DuPont site, Chestnut Run, to transform it into a world class science and innovation park.

DEMEP

Created in partnership with Delaware Technical Community College, the **Delaware Manufacturing Extension Partnership** is a federally and state funded non-profit organization that serves the competitive needs of manufacturers in Delaware. DEMEP offers a variety of strategic growth courses and collaborates with NIIMBL.

STAR

The 272-acre **Science, Technology, and Advanced Research** Campus combines research, talent, and businesses. The campus at UD is home to Chemours' global R&D facility, NIIMBL, and the University's top-ranked health sciences programs.

OSCAR

Located at DSU, the **Optical Science Center for Applied Research** is a state-of-the-art research facility which is funded by the National Science Foundation.

DTP

Delaware Technology Park provides early-stage companies with access to resources and connections. Today, more than 100 companies have set up operations here. DTP also has coworking labs and office space at the STAR campus at UD.

DISI

Operating at DuPont's Experimental Station Campus, **Delaware Innovation Space** offers more than 100,000 square feet of state-of-the-art lab space, focused on supporting growing companies in science, technology, manufacturing, and more.

LAB

Responding to industry demand, the Delaware Prosperity Partnership, state legislators, the Office of the Governor, real estate partners, and industry consortiums collaborated to designate public funds for lab space development for small to medium sized companies. The State approved up to $3 million for fiscal year 2021 and an additional $10 million for the program starting in fiscal year 2022. A company that is partnering with a developer for a specific project may apply for up to one-third of the cost (up to $150/foot) for building out the lab space. The grant would not cover all of the cost, but it will help them reserve some of their resources to focus on their research and getting their products commercialized – instead of spending it all toward building expensive infrastructure.

EDGE

In 2019, Delaware's Division of Small Business released a new grant opportunity—the **Encouraging Development, Growth & Expansion** or EDGE grant—aimed at helping new, small businesses, particularly in the STEM field, compete with large companies. Through a competitive selection process, each round the Division of Small Business awards ten Entrepreneur Class grants of up to $25,000 and five STEM Class awards of up to $100,000 each round. Of the 15 STEM awards granted in 2019 and 2021, eight were related to life sciences ranging from medical devices to agriscience.

INNOVATION & INVESTMENT ENVIRONMENT

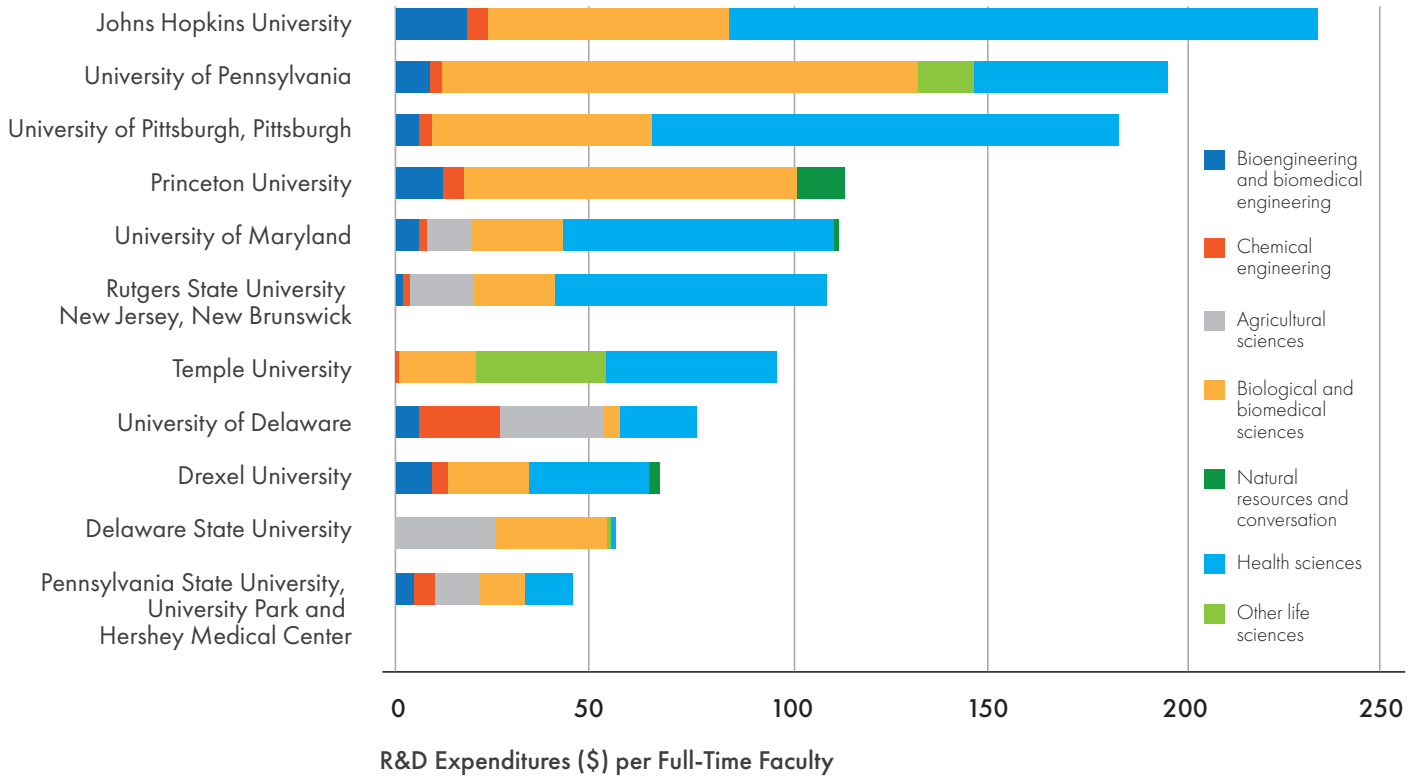
Delaware's academic institutions are key drivers of innovation and research in the state's life sciences ecosystem, with substantial R&D expenditures

In Delaware, the majority of academic research & development is conducted at the University of Delaware and Delaware State University. UD has the highest R&D spend in the state, with more than $200 million in R&D expenditures in 2019, about one-third ($60.5 million) of which was devoted to life sciences-related research, including agricultural sciences, biological and biomedical sciences, health sciences, and other life sciences.[24] DSU's overall R&D spend is smaller at $23 million in 2019, also growing with a higher share focused on life-sciences related research (about 60%, or $13.8 million).

However, Delaware institutions' composition of bioscience-related R&D expenditures varies significantly from similar institutions in surrounding states, with nearly half of life sciences R&D expenditures at both Delaware institutions dedicated toward agricultural sciences and the remainder split between research in health sciences and biological and biomedical sciences.[25] This allocation partly reflects Delaware's continued position as an agricultural leader, which presents real opportunities for the transformation of cutting-edge research into commercialized agricultural bioscience activity. But it also reflects the fact that other states in the region have medical schools and in some cases national laboratories, which are hubs for health and biomedical science research activity and typically account for outsized shares of overall life sciences R&D expenditures (see Figure 5).

Figure 5.

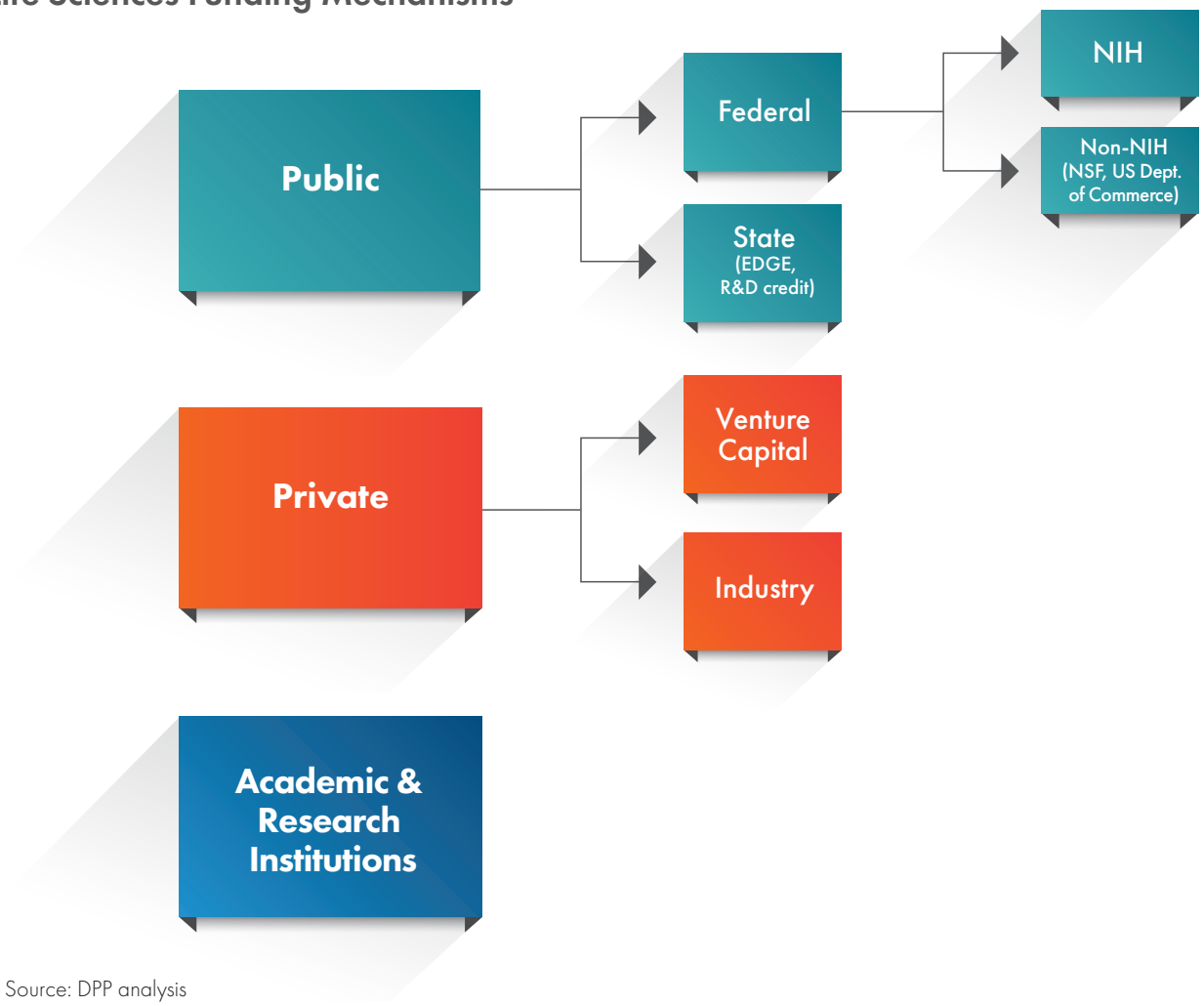
Life Sciences-Related R&D Expenditures, Notable Mid-Atlantic Research Universities, 2019



Source: National Center for Science and Engineering Statistics, Higher Education Research and Development Survey, 2019; National Center for Education Statistics, College Navigator, Fall 2019; DPP Analysis.

Figure 6.

Life Sciences Funding Mechanisms



Source: DPP analysis

Complicating matters is the fact that seemingly relevant subcategories of R&D expenditures are captured separately outside of the broader life sciences category in the data, most notably biomedical engineering (separate from biomedical science) and chemical engineering, a critical field for advanced manufacturing in the biosciences. On these measures, UD's biomedical engineering expenditures are on par with most institutions across the region on a per capita basis, while chemical engineering expenditures are more than seven times other institutions in the region on a per capita basis.

The growth in federal funding for Delaware institutions undergirds the scale of R&D activity in the state

While there are some unique contours to expenditure patterns in Delaware, the fact remains that the overall spend on R&D, and for life sciences research in particular, is substantial and growing in Delaware. Research institutions across the state have been effective in securing federal funding for overall scientific research, particularly under specialized funding programs at the National Institutes of Health (NIH) and the National Science Foundation (NSF) (see Figure 6).

The University of Delaware ranks among the top 10% nationally for NSF R&D expenditures, while Delaware State University ranks 5th among HBCUs for R&D expenditures.[26] Outside of the universities, institutions like Nemours have also been key recipients of federal funding to support projects such as biomarker research for chronic diseases and enzyme replacement therapy.

NIH Funding

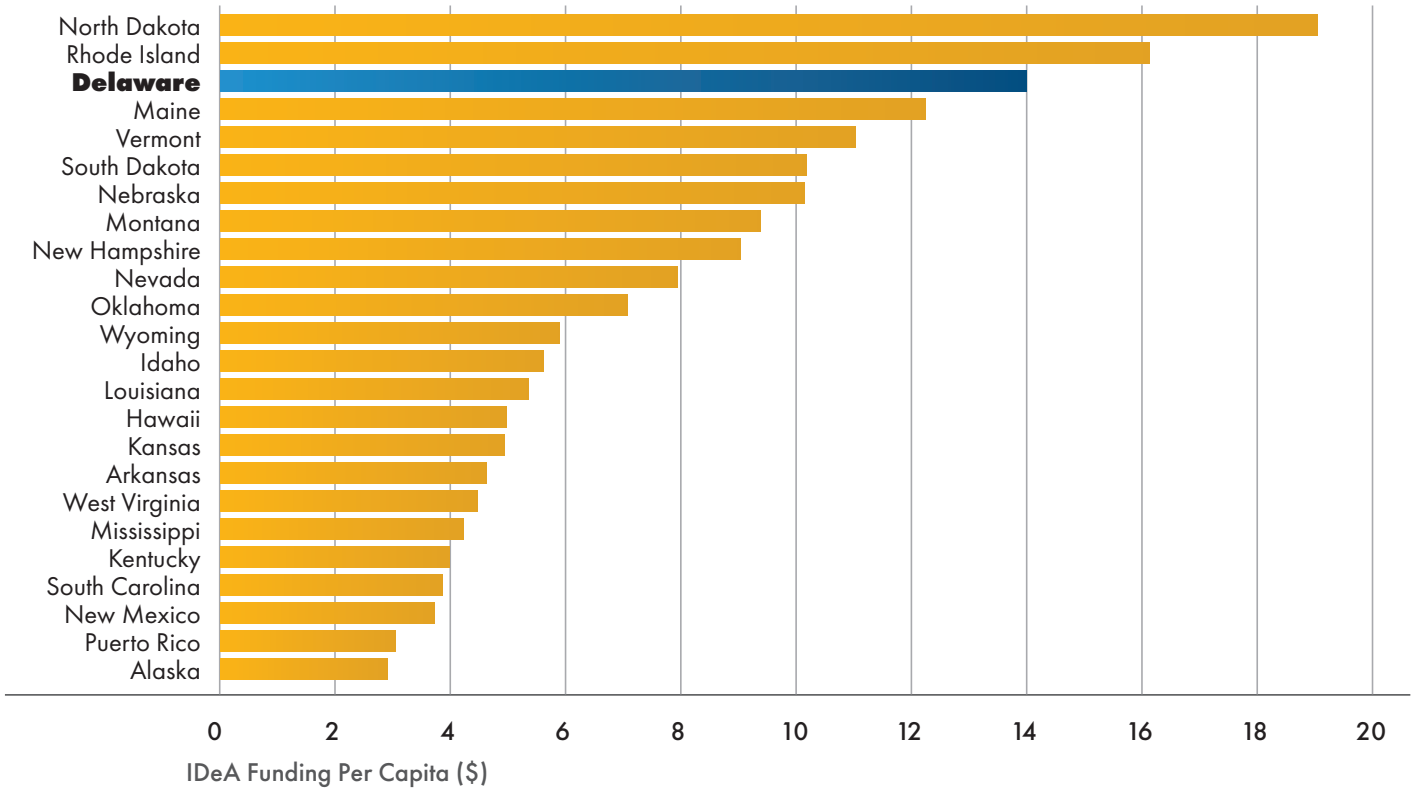
Since 2000, Delaware's R&D funding from NIH as a share of overall NIH R&D allocation has more than doubled. In real terms, Delaware institutions received more than $58 million in 2020.[27] Nationally, the NIH contributes approximately 82% of total federal investment in medical and health, so it is a key determinant of federal resources for life sciences research in any given state.[28]

One of the key drivers of this growth in NIH funding for Delaware during the past two decades was the introduction of the Institutional Development Award (IDeA) program. IDeA is a congressionally mandated program with the goal of increasing the geographical distribution of NIH funding for biomedical research through three components: the INBRE (IDeA Networks of Biomedical Research), the COBRE (Centers of Biomedical Research), and the Clinical and Translational Research Initiative.

With $13.6 million in currently active IDeA projects, Delaware is among the top three recipients of the program on a per capita basis (see Figure 7). The University of Delaware accounts for the largest share of this funding ($12.2 million) and as an institution, is one of top institutional recipients of IDeA funding nationally.[29] Only the University of Oklahoma Health Sciences Center and the University of Louisville outpace

Figure 7.

IDeA Funding Per Capita, Active Projects as of August 2021



Source: American Community Survey 1-Year Estimates, 2019; National Institute of General Medical Sciences, IDeA Interactive Portfolio Dashboard, Data as of August 3, 2021; DPP Analysis.

IMPACT OF THE DELAWARE SMALL BUSINESS DEVELOPMENT CENTER (DSBDC)

Since 2015, the Small Business Administration (SBA) has granted the DSBDC Federal And State Technology (FAST) loans to increase the number of SBIR/STTR awards in underrepresented areas. As a result, Delaware's share of SBA funding has increased significantly in recent years, and the SBA honored the DSBDC with the Tibbetts Award for its exceptional successes. From 2015 to 2019, Delaware's SBIR/STTR funding nearly doubled from $10.3 million to $20.1 million, according to analysis of award data from the Small Business Administration. And according to the SBA, since 2016, 73% of all Delaware-based technology companies receiving SBIR funds have been clients of the DSBDC, and these clients have received 86% of all SBIR/STTR and Small Business Technology Transfer funds awarded in the state.

UD, with $15.7 and $12.9 million, respectively. Nemours has also been a major recipient of IDeA funding over the years. The Center for Pediatric Research has received more than $30 million since 2004, and the Delaware Comprehensive Sickle Cell Research Center received approximately $11 million between 2014 and 2018. DSU houses the Delaware Center for Neuroscience, which has received increased funding from the COBRE program. In 2017, DSU was awarded $10.9 million, the largest grant in the university's history, to build on success achieved under Phase I of COBRE.

While the IDeA program has been a source of growth for Delaware R&D funding, it still represents just about one-quarter of all NIH funding received by Delaware institutions and less than 10% of the number of currently active NIH projects in the state.[30] As of July 2021, there were 138 active NIH-funded projects in Delaware, with about three-quarters of those housed at UD. Large grants include a spinning disk confocal and single molecule localization microscope for the Bioimaging Center and an adolescent brain and behavioral outcomes study. Delaware State University and Nemours are the second largest recipients of current NIH grants with nine projects each, and organizations such as Compact Membrane Systems, Advanced Materials Technology, the Delaware Division of Public Health, and the Delaware Department of Agriculture received the remaining 24 grants.

Several Delaware institutions and companies were beneficiaries of increased NIH funding due to the Covid-19 pandemic. ANP Technologies received $19.7 million from NIH/NIBIB/Rapid Acceleration of Diagnostics (RADx) Program for its NIDS® COVID-19 Antigen Rapid Test Kit. Delaware State University received a NIH RADx-Underserved Populations (UP) award for $1.1 million to examine the social and behavioral implications of Covid-19 testing in Delaware's underrepresented communities.

NSF Funding and SBIR/STTR

Aside from NIH, the National Science Foundation is the second-leading source of federal dollars for scientific research. Overall, Delaware institutions received $44 million in funding from the NSF in 2020, with at least $12 million and up to $20 million dedicated toward life sciences research.[31]

Because Delaware's most recent five-year NSF allocation was equal to or less than 0.75% of the total NSF budget, the state is eligible for the NSF-funded Established Program to Stimulate Competitive Research (EPSCoR) program. With these EPSCoR grants, the University of Delaware, Delaware State University, and Delaware Technical & Community College have collaborated to develop their research capabilities. To date, Delaware's EPSCoR program has focused on the theme of complex environmental systems and ecosystem health. The current grant, titled on Water in a Changing Coastal Environment of Delaware, has received not only $19.2 million in federal funding but also $3.8 million from the state of Delaware in support of this initiative.

Additionally, with support from the Small Business Development Center, more small businesses in Delaware are receiving Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants from the Small Business Administration. These grants encourage small businesses to engage in R&D for potential product commercialization. Delaware recipients include both more established bioscience companies, such as Compact

Membrane Systems, ANP Technologies, and Frontier Scientific Services, as well as life sciences startups. Between 2016 and 2018, Delaware small businesses received 0.73% of the total SBIR/STTR awards granted compared to just 0.59% in the three years prior (see "Impact of the Delaware Small Business Development Center" on the previous page).[32] With the overall number of small businesses in a state considered, Delaware ranks 2nd in the nation with 14.21 STTR awards per 1,000 firms and 7th in the nation with 51.1 SBIR awards per 1,000 firms.[33]

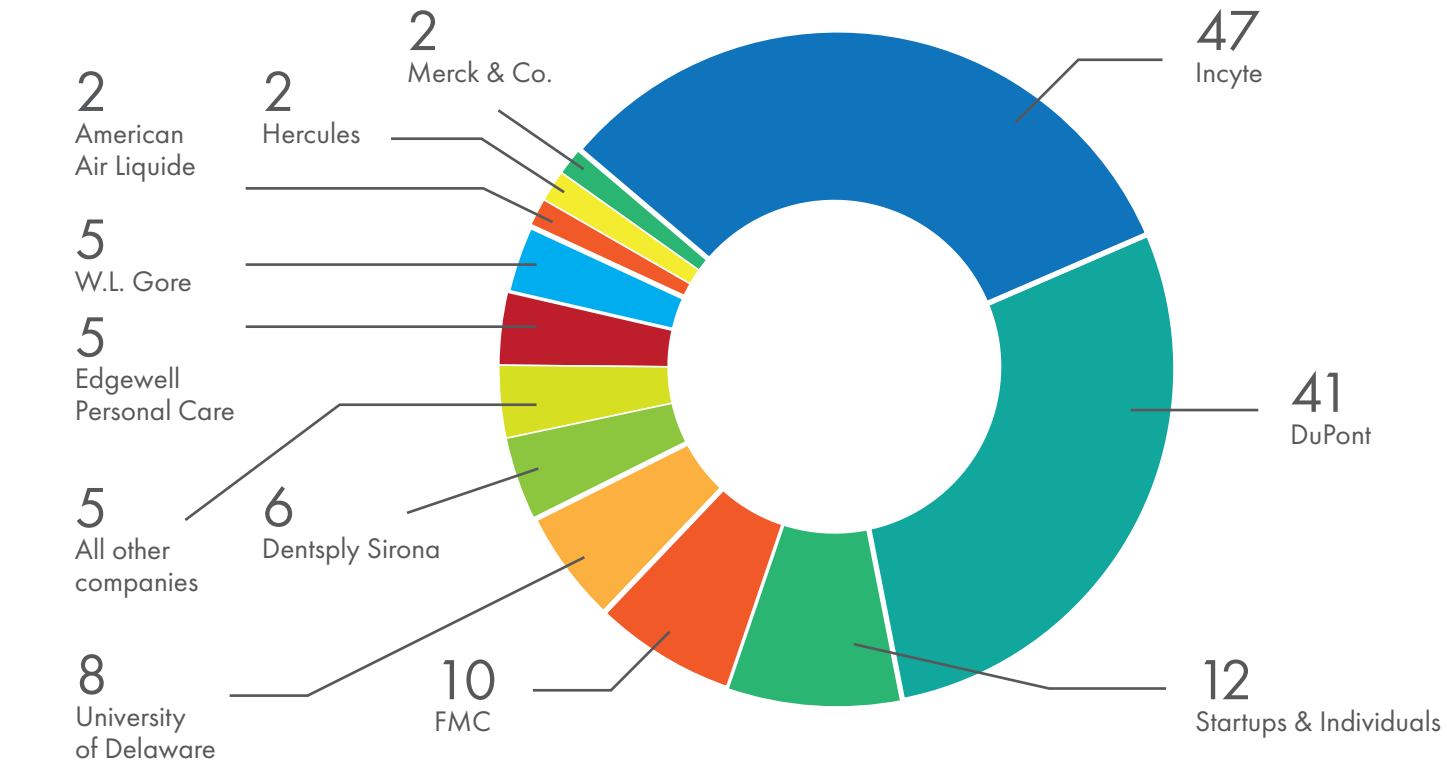
Still, private industry and venture capital are key drivers in the state's life sciences growth

Across all U.S. industries, health and medical applications account for the largest share of overall R&D investment, representing 26% of the total $441 billion of R&D performed by businesses in the United States in 2018.[34] While federal funding is a critical component for funding cutting-edge research and creating long-term commercialization opportunities, private industry accounts for more than three-quarters of total health and medical R&D spending.[35]

In Delaware, these trends are partially reflected in patenting activity. Delaware ranks 8th in the nation in the number of bioscience-related patents per capita.[36] Entities like the University of Delaware's Office of Economic Innovation and Partnerships (OEIP) and the state's deep bench of patent law experts provide critical support to entrepreneurs and innovators in patenting, helping to ensure that individuals, startups, and university researchers are substantial contributors to overall patenting activity in the state. However, the vast majority of patenting activity comes from private companies like Incyte, DuPont, FMC, and Gore (see Figure 8).

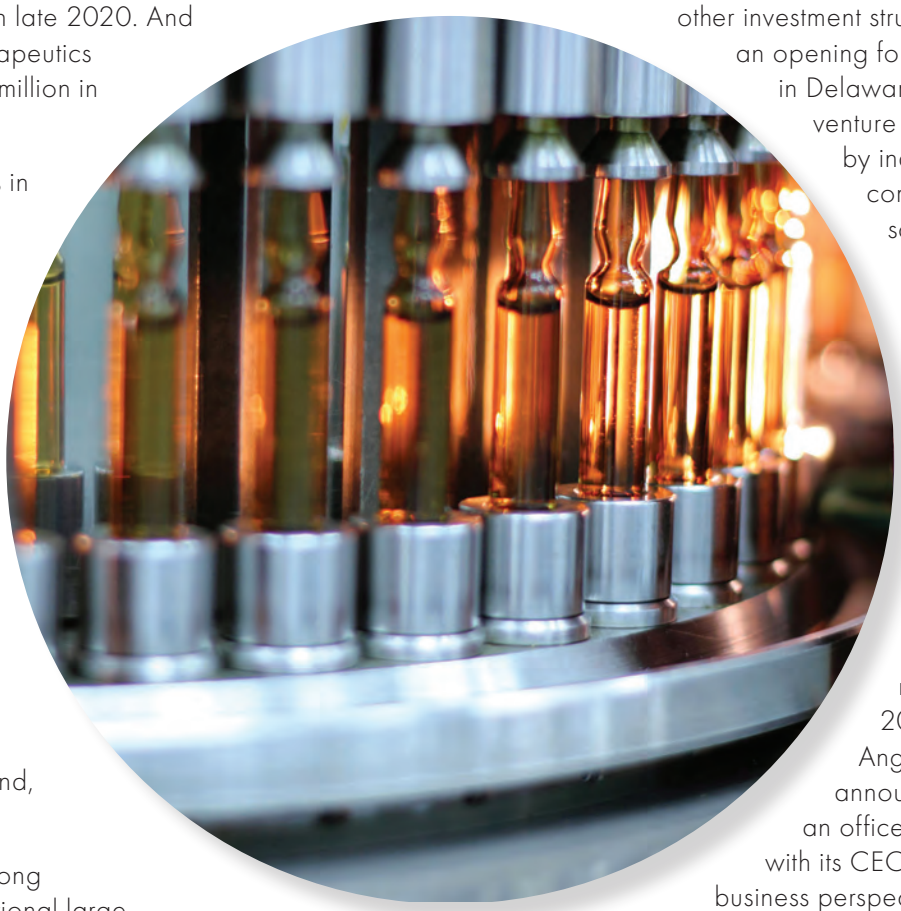
Figure 8.

Life Sciences-Related Patents in Delaware, 2020



Source: U.S. Patent and Trademark Office, 2020; DPP analysis.

Larger, more established companies have a wide range of resources to draw on for continued R&D, but for the new wave of early stage and growth companies in the life sciences sector, venture capital is a critical resource. In Delaware, venture capital investments in the life sciences sector have increased rapidly in recent years, from $22.2 million in 2017 to $111.4 million in 2018 and $123.9 million in 2019.[37] Most of this significant VC increase can be attributed to one key company, Prelude Therapeutics, which raised $145 million since its inception in 2016, before going public in late 2020. And in 2021, NiKang Therapeutics alone secured $200 million in Series C funding.



Two large investments in Prelude Therapeutics catapulted Delaware from $28.4 million in venture capital funding per capita (2012-2015) to nearly $300 million per capita (2016-2019). As a result, Delaware ranked 7th for life sciences venture capital funding per capita in between 2016 and 2019—outpacing Pennsylvania, Maryland, and New Jersey.[38]

While this position, along with subsequent additional large investments in companies like NiKang Therapeutics, show the promise of attracting significant venture capital to Delaware, these rapid changes in relative ranking based on the fortunes of one or two companies also illustrate the year-to-year volatility that Delaware could see without a broader base of scalable companies. Other states, including North Carolina, Pennsylvania, and New Jersey, have already established successful public or public-private venture funds to help broaden such a base of scalable companies. In North Carolina, the NC Innovation Fund (NCIF) is a $232.3 million diversified investment partnership sponsored by the North Carolina Retirement Systems. Ben Franklin Technology Partners is a 35-year-old seed and early-stage capital provider for Pennsylvania tech companies. Recently, New Jersey developed the Innovation Evergreen Fund, which auctions state tax credits to invest in emerging companies. While there are many forms such a fund could take in Delaware, it could quickly be a critical driver in developing a stable pipeline of scalable companies.

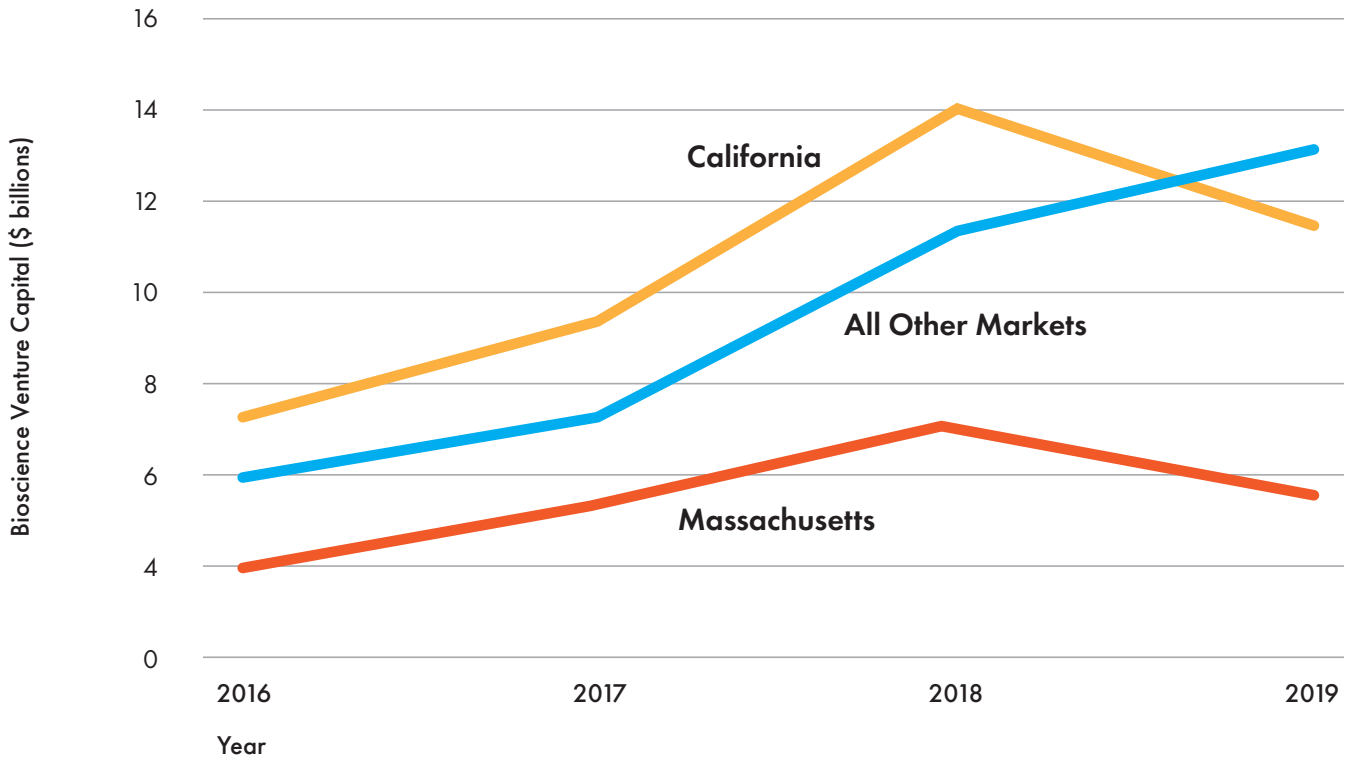
Beyond these venture capital structures, though, other investment structures could provide an opening for life sciences financing in Delaware. One is the rise in venture capital funds created by individual private companies. Delaware life sciences firms can look toward funds like FMC Ventures, FMC's new capital investment arm. Announced in June 2020, FMC Ventures will be headquartered in Philadelphia to advance emerging agtech innovation. Another is growth in angel investor networks. In March 2021, East Carolina Angels (EC Angels) announced that it would open an office in Sussex County, with its CEO explaining, "From a business perspective, EC Angels is part of a syndicate of VCs and angel groups all along the east coast — Georgia up to North Carolina. This new office will provide access to new investment opportunities further north from North Carolina to Delaware and its surrounding states."[39] Delaware has an opportunity to tap into these growing regional assets to support its growing life sciences companies (see "Regional Venture Capital Growth").

REGIONAL VENTURE CAPITAL GROWTH

While California and Massachusetts still account for the vast majority of venture capital deal volume in the life sciences sector, other regions have begun to make inroads in capturing a larger slice of activity in recent years (see Figure 9). One of the markets seeing accelerating activity is neighboring Pennsylvania, led by Philadelphia. Between 2016 and 2019, Pennsylvania-based companies received nearly $3.5 billion in bioscience-related venture capital, according to the TEConomy/BIO 2020 Pennsylvania state report. In the Greater Philadelphia region, the rapidly developing cell and gene therapy sector is contributing to the increased share of venture capital investments. The CEO Council for Growth estimates for the first quarter of 2021, nine transactions in the cell and gene therapy space totaled more than $980 million. For example, Gyroscope Therapeutics—located in the suburbs of Philadelphia—raised $148 million in VC funding as of March 2021 for its potential treatment for geographic atrophy secondary to age-related macular degeneration. In Chester County, XyloCor Therapeutics raised $41.9 million in venture capital funding. While Delaware presents its own distinct advantages for life sciences companies of all types, there remains a significant opportunity to better connect with the rising visibility of the wider region amongst venture capitalists.

Figure 9.

Geographic Distribution of Life Sciences Venture Capital Investment



Source: Teconomy/BIO, "The Bioscience Economy: Propelling Life-Saving Treatments, Supporting State & Local Communities," 2020; DPP analysis.

STRATEGIC OPPORTUNITIES & FUTURE PATH

Delaware will continue to face considerable competition from other states and regions to capture the current and expected future growth in life sciences economic activity. Seizing the full promise of this immense opportunity will require clear, unwavering focus and effective collaboration across government, higher education, and industry. Over the past year, key efforts were launched to focus greater strategic direction in this sector, from the legislative Life Science Caucus to the Science + Technology Advisors initiative at the Delaware Prosperity Partnership. The Science & Technology Advisors includes 30 leaders from across Delaware's innovation ecosystem—representatives of companies large and small, academics, investors, and business groups—to help chart the path toward an even more coordinated, robust entrepreneurial and innovation ecosystem, with life sciences as a key driver. Leaders must align and prioritize strategies that support a ready, highly skilled labor force, ample infrastructure and sites for expansion, and funding and incentives for new and growing life science businesses. The state must also effectively leverage its unique, complementary features within the thriving Mid-Atlantic/Philadelphia region.

Workforce Development

Across industries, companies increasingly look to a region's talent pool as a key driver of location decisions, and life sciences is no different. While Delaware competes well, with a strong talent base from technicians and operators up through PhDs, the state will need to continue to grow its talent base across occupations to meet the needs of growing companies and new companies entering the Delaware market. DTCC's ability to help support WuXi STA's growth plans through its operator training program is one example, and if such programs can be sustained at scale, they can prove a significant attraction to companies looking at Delaware as a place to locate as well as reassurance to existing companies that they will be able to meet their talent needs at home. Opportunities exist to create a more seamless workforce development pipeline and real-time information sharing about occupations in high-demand and specific skills needed. The state can also strengthen and better leverage ties with NIIMBL, which is a powerful, enviable asset to have as the national focus on increasing domestic biopharmaceutical manufacturing activity continues to accelerate.

Lab Space Supply

While labor is a key driver in decision making for life sciences companies in where to locate, companies also need a wide range of options to meet their physical space requirements. While other markets in the region are seeing millions of square feet of lab space developed, both ground-up development and through office conversions, Delaware's lab supply is lagging. Some companies are in a position to look towards build-to-suit options, but more ready-to-go space, or designated sites primed for lab construction, would put Delaware in a better position to accommodate growth of existing companies and in attracting companies. The State's graduated lab space program, initially funded with $3 million in pilot funds and more recently with $10 million in committed funds for FY2022, will serve a critical need in developing space for companies taking the next step in their growth. The announced planned acquisition of DuPont's Chestnut Run laboratories by MRA Group, a Pennsylvania developer with substantial experience building life science campuses, will significantly add to lab inventory in Delaware and could be a positive sign that seasoned developers are eyeing Delaware as a growth opportunity. Finally, the recently announced Riverfront East redevelopment project in Wilmington presents unique possibilities for a thriving urban campus for lab-based companies set amongst an 86-acre mixed use project, and leaders have been increasingly vocal about the role that labs could play in the development.[40]

Industry/Higher Education Collaboration

Colleges and universities play an essential role not only in conducting cutting edge research, but they serve as a key conduit for commercialization of research and seeding a pipeline of startups in the life sciences. Stakeholders need to simplify and accelerate technology transfer, with greater coordination and communication between industry and higher education. Incentivizing mature businesses to convene startup events, share technology and market insights, and offer mentorship opportunities would help create a stronger feedback loop in Delaware's life sciences ecosystem. The moment is ripe to explore more structured partnerships between key employers and higher education to advance dialogue about the merit, viability, and impact such institutions could have on spurring further growth in Delaware's life sciences sector.

Access to Capital

Greater access to capital for growing life sciences companies will be critical in sustaining industry growth in Delaware. Recently-created grant programs like EDGE grants, awarded since 2019 and providing up to $100,000 for STEM startups, are a key tool for early-stage companies, but could benefit from more specificity in the maturity level of companies targeted for funding. Focusing EDGE grants on those companies that are ready to start scaling in preparation for commercialization, rather than very early-stage companies, may be a better focus, while enhancing the earlier-stage focused Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) match grant. While expansion and more narrow targeting of these programs would be a positive step forward, the unprecedented federal funds appropriated to Delaware through the American Rescue Plan Act (and in particular the $56 million allocated through the Act's State Small Business Credit Initiative) provide a rare opportunity for the state to consider its role in venture capital investment. Neighboring states, and many states across the country, have embraced opportunities to provide critical equity funding to promising companies within their states, to fill a market gap in the private markets. Utilizing federal funds to capitalize such a program in Delaware could be a wise investment in ensuring the state has additional flexibility to retain and grow promising early-stage life sciences companies in the state.

Future Path

Delaware is ideally positioned to accelerate the pace of life sciences activity, solidifying its position as a leading driver of the state's future success. The state has a robust foundation of companies across all growth stages and segments of the sector, world class local and regional talent, and rising private and public investment. The response to the Covid-19 pandemic has only reinforced the critical importance of biomedical innovation, while the decision by WuXi STA to locate its biopharmaceutical production facility in Middletown creates a new anchor in the state for advanced manufacturing and underlines the state's compelling value proposition to companies considering where to locate or launch. That decision also helps to stretch the geographical boundaries of the state's life sciences corridor further south, opening more of the state to potential growth opportunities in the sector. At the same time, a generational infusion of federal funding—from measures including the American Rescue Plan Act and the U.S. Innovation and Competition Act, to the potential for legislation funding wide-ranging physical and human infrastructure—gives Delaware rare advantages in capturing a larger share of activity in the life sciences sector and the capital to seed growth. With continued focus by public and private stakeholders on strategic policies, partnerships, and investments, Delaware is poised to capitalize on the momentum and opportunity in life sciences in the next decade and beyond.

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