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DELAWARE BUSINESS TIMES

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FOR MORE INFORMATION

Contact: Tracy Shickel (tschickel@udel.edu)
Director, Economic Development
Phone: 302-831-2200

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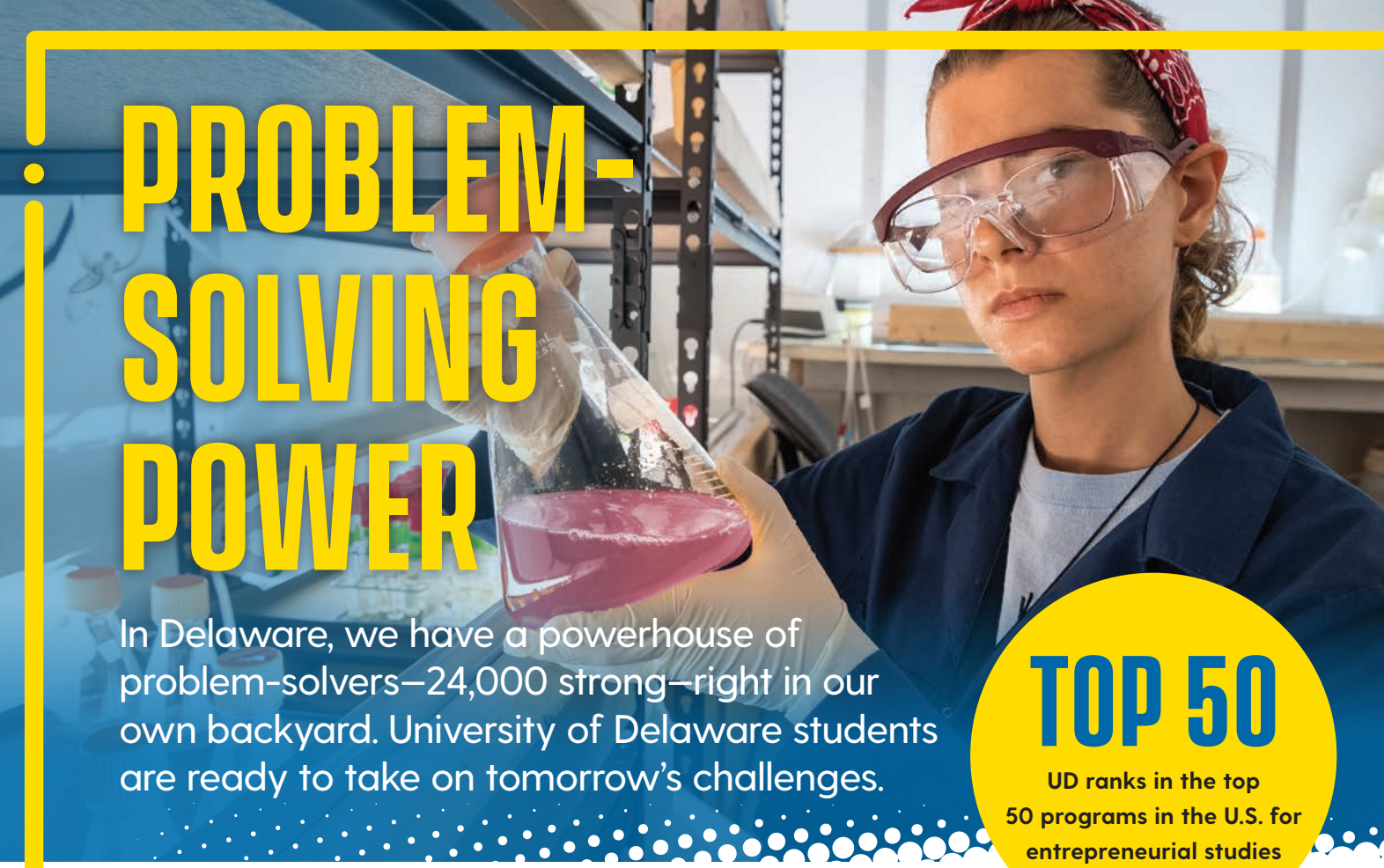

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UD ranks in the top 50 programs in the U.S. for entrepreneurial studies

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Horn Entrepreneurship
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Office of Economic Innovation & Partnerships
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WELCOME

Welcome to *Innovation Delaware*, your guide to Delaware's most inventive and creative organizations. This issue highlights the spirit of innovation and entrepreneurship across the First State.

This is an unusual and difficult time. As we begin to safely reopen Delaware's economy, I want to recognize all Delawareans and Delaware businesses that have sacrificed so much to keep our communities safe and healthy. It hasn't been easy, and there's plenty of work ahead of us.

But I'm confident Delaware will come out of this stronger, because we worked together to confront the threat of COVID-19.

Delaware is a great place to live and work. We have a central location along I-95, award-winning beaches and parks, great communities, and responsive leadership in business and government. The Delaware companies you will read about in this issue exemplify the many reasons that businesses of all sizes have made their home in the First State.

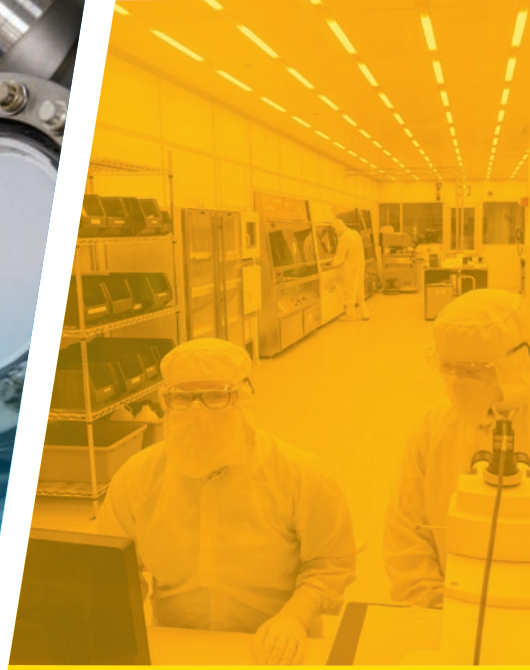
Delaware companies are paving the way in manufacturing, agribusiness, science, technology, health care and other industries important to our future success as a state. These companies and their workers represent inspiration and ingenuity through their products and services, which enhance the lives of many.

Thank you to all Delawareans for your spirit of innovation and entrepreneurship, and for all your sacrifices during this COVID-19 crisis.

By continuing to work together, and looking out for our neighbors, Delaware will get through this challenging time stronger than ever.

Sincerely,

John C. Carney
Governor, State of Delaware



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Contact: Gerald Poirier (gpoirier@udel.edu)
www.udel.edu/amcl

UNIVERSITY OF DELAWARE

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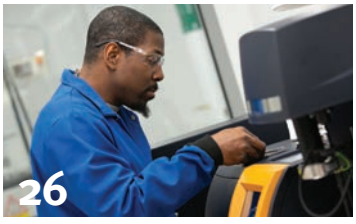
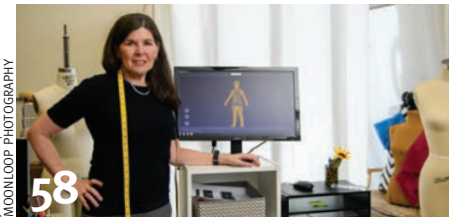
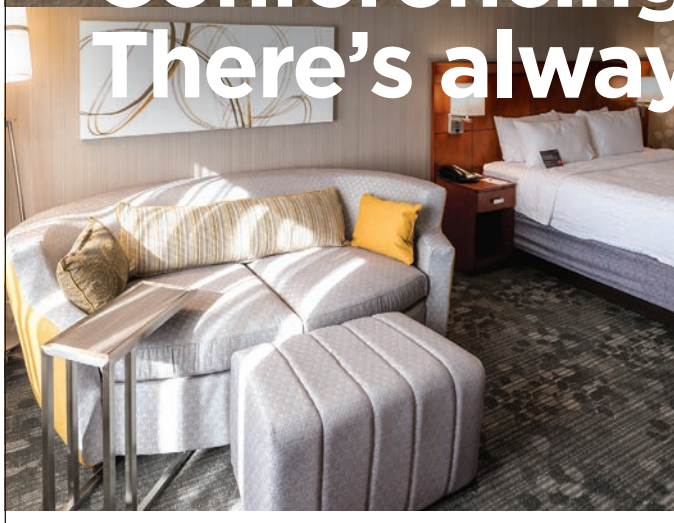




JUSTIN HEYES/ MOONLOOP PHOTOGRAPHY

features

Conferencing on Campus. There's always a way.



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We miss our clients. We miss the personal engagement. But we're not giving up. We've established Virtual Meeting Coordination Services to assist you in your strategy to continue business through virtual meetings and conferences. This could be the future, and we're already there — with the tech needed to broadcast events and open spaces that provide generous social distancing. Our vast lobby is adaptable. The Audion and Atrium in the visionary Tower at STAR Campus are flexible. Our own Courtyard by Marriott hotel provides a clean, private refuge. Let's make this work.

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Delaware Business Times is printed 26 times per year by Today Media, 3301 Lancaster Pike Suite 5C, Wilmington DE 19805 and is available by subscription for $39 per year. Periodicals postage paid at Wilmington, DE and additional mailing offices. Single copy/back issues are available at the cover price of $2 plus $2 shipping and handling.

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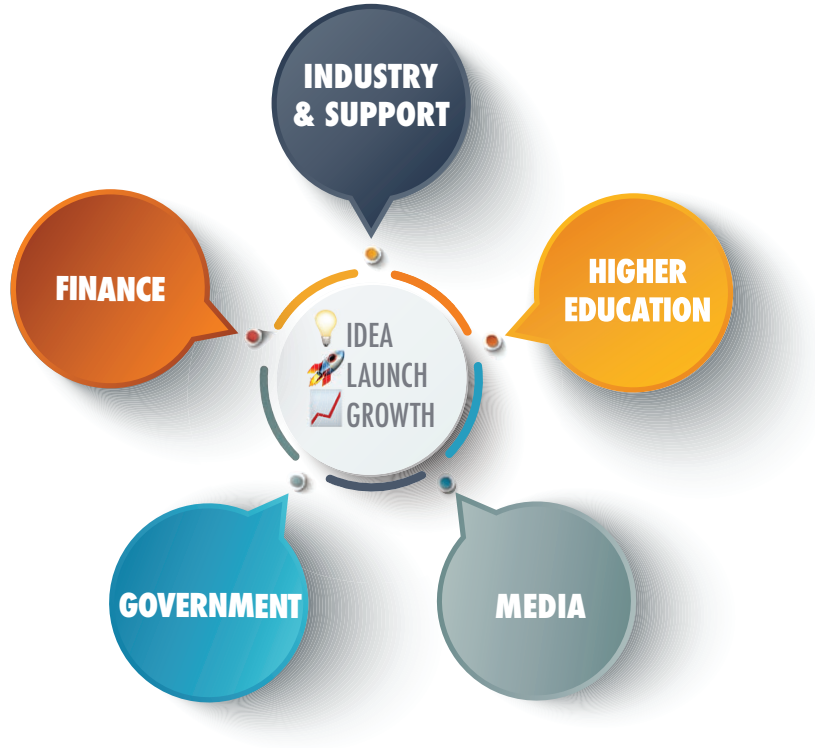
Delaware Innovation & Entrepreneurship Ecosystem

Delaware is a Mid-Atlantic Business Hub for Innovation, Talent & Leadership

Ready for your business to prosper? We're the lead economic development resource for the state of Delaware, and we're here to help your business thrive.



PRIVATE INVESTMENT
- BioAdvance
- Chemical Angel Network
- Leading Edge Ventures
- Keiretsu Forum - Mid-Atlantic
- Mid-Atlantic Diamond Ventures
- Osage Venture Partners
- Robin Hood Ventures

PUBLIC FUNDING
- Angel Investor Tax Credit (DE)
- DE Biotech Institute CAT Grant
- DE Technical Innovation Program
- EDGE Grants
- R&D Tax Credit (DE)
- SBA Loans

COMPETITIONS
- neoFest - Startup 302
- Reinventing Delaware
- Swim With The Sharks

LOCAL
- Kent Economic Partnership
- NCC Innovates
- Sussex County Office of Economic Development
- Wilm. Office of Economic Development

STATE
- DE District Office - SBA
- DE Division of Small Business
- DE Prosperity Partnership

CDFIs
- True Access Capital
- Cinnaire - Delaware
- WEDCO

LOCAL
- Delaware Business Now
- Delaware Business Times
- Delaware Today
- DPP Innovation Quarterly
- Hoy en Delaware
- The News Journal
- Out & About
- Technical.ly Delaware
- Town Square Delaware

REGIONAL
- Baltimore Business Journal
- Delmarva Farmer
- Philadelphia Business Journal
- Technical.ly Baltimore
- Technical.ly Philadelphia

EVENTS
DE Biopharmaceutical Science Symposium
DESCA Investor Forum
Millenial Summit
NCC Entrepreneurial Summit
neoFest
One Million Cups - DTCC
Startup Grind Wilmington
Tech Innovation in DE Ecosystem (TIDE) MEETUP
Tech Forum of Delaware

INDUSTRY ASSOC.
DE Bioscience Association
DE Manufacturing Extension Partnership
DE Sustainable Chemistry Alliance (DESCA)
First State Fintech Lab
NIIMBL

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DE Bio DOME
DE Innovation Space
DE Technology Park
DTP@STAR
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Middletown Business Incubator
The Mill
NextFab
UD Venture Development Center
The WIN Factory

SUPPORT
DE Founders Initiative
DE IQ
DE Small Business Development Center
DESCA Tech Connect
First Founders Accelerator
Launcher DE
SCORE DE
SEDAC
Small Business Alliance - DSCC
Wilmington Alliance

TALENT
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TechImpact IT Works
ZipCode Wilmington

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DELAWARE STATE UNIVERSITY
DE Center for Enterprise Development
Food Business Incubation Center
The Garage @ DSU

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DBA Program - Business Consulting
GBC Entrepreneurship Club
MBA - Entrepreneurial Studies

WESLEY COLLEGE
MBA - Entrepreneurship Focus

WILMINGTON UNIVERSITY
Entrepreneurship and Small Business Certificate

UNIVERSITY OF DELAWARE
Blue Hen POC (Horn)
Hen Hatch (Horn)
Maker Gym
MIS Sr. Capstone Proj. (Lerner)
NSF I-Corps @ UD
OEIP
Spin-In Program
Summer Founders (Horn)

Delaware's entrepreneurial economy is getting the attention of venture capitalists and innovators. DPP ensures that resources are aligned and visible to the community, so that support is accessible, inclusive and transparent for entrepreneurs and innovators. The DPP Innovation and Entrepreneurship Ecosystem map provides a quick, at-a-glance primer highlighting activity hubs for early-stage companies to hit the ground running in Delaware.

SEE SOMETHING YOU WANT TO KNOW MORE ABOUT? WE WANT TO HEAR FROM YOU. CONTACT US AT:

agruswitz@choosedelaware.com
or nolson@choosedelaware.com

DELAWARE PROSPERITY PARTNERSHIP

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Delaware Prosperity Partnership

PRESENTING SPONSOR

Kurt Foreman
President and CEO

This year is a significant one for Delaware and for the world as communities and industries adapt to reopen and recover from the COVID-19 pandemic. Market disruptions can also be a time of significant innovation and breakthrough discoveries. The Delaware Prosperity Partnership (DPP) team is working tirelessly to support Delaware businesses as they navigate reopening and economic recovery while maintaining its focus on business retention, attraction, growth, innovation and talent.

Already known for its culture of innovation, businesses throughout Delaware continue to innovate. DPP is supporting mature, existing enterprises such as Solenis, which celebrated the opening of a new headquarters at Avenue North this year as well as promising enterprises in their early stages of growth such as Delaware's own homegrown successes like Carvertise.

With one of the highest per-capita patent rates in the country, Delaware continues to attract entrepreneurial innovators in sectors ranging from high-tech agriculture to fintech. "At DPP, we believe that encouraging innovation and entrepreneurism will benefit not only the more seasoned businesses that call Delaware home, but also encourage innovators from around the globe to choose Delaware for building on their next big idea," says Kurt Foreman, president and CEO of Delaware Prosperity Partnership.

University of Delaware

PRESENTING SPONSOR

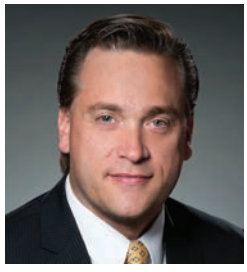
The University of Delaware (UD), founded in 1743, is the eighth-oldest university in the country. UD's storied tradition of academic excellence continues today in both the classroom and laboratory, with consistent ranking among the top 30 public universities. Beyond its Georgian-inspired main campus in Newark, Delaware, UD has locations across the state—in Wilmington, Dover, Georgetown and Lewes.

UD is a state-assisted, privately governed institution and one of a select group of institutions in the United States to hold the triple land-grant, sea-grant and space-grant designation. The Carnegie Foundation for the Advancement of Teaching classifies UD as a research university with very high research activity—a designation accorded less than 3% of U.S. colleges and universities. UD ranks among the nation's top 100 universities in federal R&D support for science and engineering.

UD offers a broad range of degree programs: four associate programs, 140 bachelor's programs, 144 master's programs (with 16 dual degrees offered within) and 60 doctoral programs through its eight colleges. Our physical therapy program is the top-ranked graduate program in the nation. The university's student body encompasses more than 19,000 undergraduates, more than 4,000 graduate students and more than 600 students in professional and continuing studies from across the country and around the globe. UD's distinguished faculty includes internationally known authors, scientists and artists, Guggenheim, Fulbright and National Academy of Inventors fellows, and members of the National Academy of Sciences, National Academy of Engineering and the American Association for the Advancement of Science. The university is fortunate to have an alumni base of more than 182,000 in 120 countries, representing a unique and global ambassador community eager to support the university's mission and pursuits.

Delaware Manufacturing Extension Partnership

CHAPTER SPONSOR



Rustyn Stoops
Executive Director

Delaware Manufacturing Extension Partnership (DEMEP) is a federally and state-funded nonprofit organization committed to helping Delaware's manufacturers improve their global competitiveness. DEMEP operates as a recipient through Delaware Technical Community College in partnership with the United States Department of Commerce, National Institute of Standards and Technology, the Delaware Division of Small Business, and the Delaware state and local chambers of commerce. DEMEP and the MEP National Network have developed a collection of tools, products and services customized to meet the unique needs of Delaware's manufacturers.

DELAWARE: A STATE OF INNOVATION

Delaware has become an innovation powerhouse.

Home to 10-person startups and corporations of over 1,000 employees alike, the state has steadily risen in recent years as a prime location to set up shop.

The First State is dotted with innovative organizations, with growing areas of development around Georgetown in Sussex County and Dover in Kent County adding to the collection of pioneering companies along the I-95 corridor.

On this page and the next, we feature some of the most innovative companies in Delaware.

ADVANCED MATERIALS/ MANUFACTURING

1 ALOFT AeroArchitects
2 Atlantic Industries
3 ILC Dover
4 MillerMetal Fabrication
5 Mobtown Offroad

AGRICULTURE

6 Allen Harim
7 CleanBay Renewables
8 Merck Animal Health
9 Perdue Farms
10 302 Aquaponics

EDUCATION/RESEARCH

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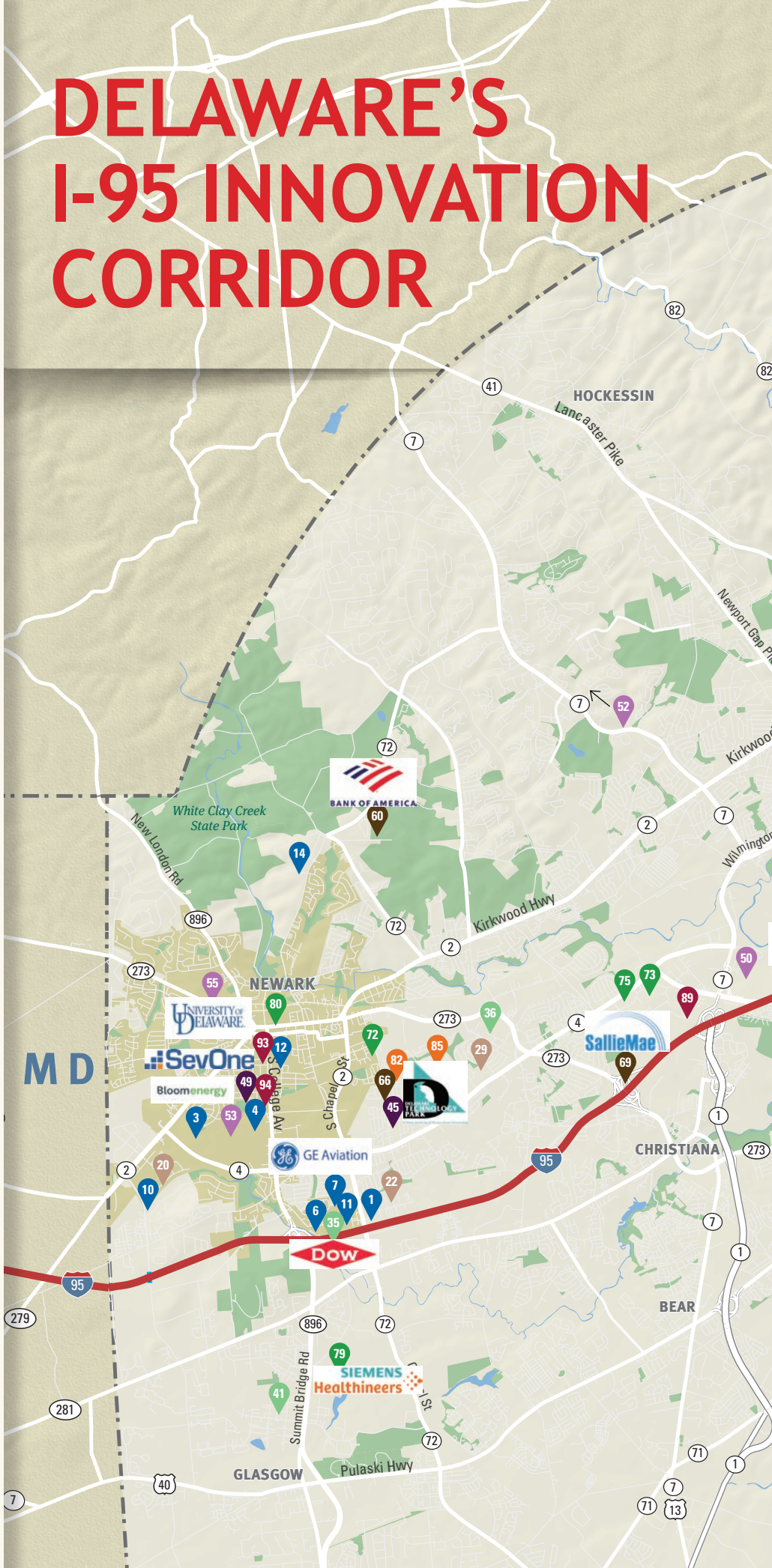
13 University of Delaware – Lewes Campus
14 Wesley College

HEALTH CARE

15 Bayhealth
16 Beebe Healthcare
17 Nanticoke Health Services

DELAWARE'S I-95 INNOVATION CORRIDOR



ADVANCED MATERIALS/ MANUFACTURING

1 Aearo Technologies
2 Agilent Technologies
3 Bloom Energy
4 DeLUX Engineering
5 DuPont
6 DuPont Vespel
7 GE Aviation
8 Honeywell
9 Mishimoto
10 Phase Sensitive Innovations
11 Rohm & Haas
12 SAS Nanotechnologies
13 TalosTech LLC
14 W.L. Gore & Associates

AGRICULTURE

15 Corteva Agriscience
16 Napigen
17 Second Chances Farm
18 Spekciton Biosciences

BIOSCIENCE

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62 Citigroup Financial
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76 LabWare
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79 Siemens Healthcare Diagnostics
80 TheraV

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86 New Castle County Emerging Enterprise Center
87 World Trade Center Delaware

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93 SevOne
94 WhyFly


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Christina Park
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Bus 13

SPECIAL REPORT: COVID-19

Delaware's innovators meet the challenges of the pandemic

Delaware's dense landscape of researchers, manufacturers and bioscience companies puts the First State in a unique position to address the impact of COVID-19. In the pages that follow, we share the stories of how Delawareans are banding together to expand testing, lower risk for health care workers, help patients recover more quickly and keep the supply chain running.

All Hands on Deck | BY JACOB OWENS

Delaware researchers, companies helping study COVID-19, find ways to treat it

Delaware's academics and biopharmaceutical industry have stepped up in the fight against the COVID-19 virus, leading studies that seek to better understand the threat while also trying to develop better testing and treatment options.

In late May, the Newark-based National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) announced it has been granted $9 million in COVID response funding from the Department of Commerce. The funds will help Delaware scientists and engineers grow vaccine-manufacturing capacity and expand testing and diagnostic capabilities.

"The scary truth is that the United States is currently not ready to mass-produce a vaccine for COVID-19, even once we've developed one, and that's a problem we need to fix right away," said Sen. Chris Coons in response to the announcement. "I'm thrilled that Delaware scientists and engineers at NIIMBL will be leading that effort."

UD researchers work to find virus' weaknesses

JUAN PERILLA and **JODI HADDEN-PERILLA**, assistant professors at the University of Delaware's Department of Chemistry and Biochemistry, are no strangers to the study of viruses, having studied hepatitis B and HIV for more than a decade.

In late March, the professors were approved for a $200,000 National Science Foundation (NSF) grant to study the molecular biology of SARS-CoV-2, the official name of the virus that causes COVID-19 and has infected millions worldwide. The one-year grant was approved through the NSF's Rapid Response Research program, which is only used in emergencies.

JUAN PERILLA, JODI HADDEN-PERILLA

The duo's work won't directly lead to the development of a vaccine, which requires researchers to find a way to get a person's body to recognize the virus and attack it to prevent an infection, Perilla explains. It is more likely to aid in the development of antiviral drugs, which can help kill the virus in an already infected person.

"We're like step zero in the process," he says. "If you know how any machine works, you have a better chance to know how to stop it."

The researchers' goal is to identify weaknesses in the virus that scientists could tailor their treatments to exploit. By altering the chemistry and changing its physics, a treatment could stop the lifecycle of the virus.

Perilla estimates preliminary findings will likely come this summer.

Perilla and Hadden-Perilla are working with Tyler Reddy, a computa-

tional virologist at Los Alamos National Laboratory in New Mexico, on the project, which also has seven other researchers assigned to it.

The researchers are working seven days a week, meeting via videoconferencing to derive new analysis tools or software while remotely connecting to their UD labs or the Frontera supercomputer at the Texas Advanced Computing Center at the University of Texas at Austin, where they run theoretical simulations of the virus.

There are currently eight identified strains of SARS-CoV-2 around the world, but Perilla's research team is only working on one of them. His experience in working with HIV, which also has many different strains, has shown that differences between strains are often subtle, and creating a final model of one strain allows researchers to detect the differences more quickly, Perilla explains.

"It's definitely better than starting from zero," he adds.

Incyte seeks to repurpose blockbuster drug

Global biopharmaceutical company Incyte announced in early April that it was studying whether it could repurpose its blockbuster drug Jakafi to aid in the treatment of COVID-19 patients.

The company reported that it was launching phase 3 clinical trials, with the assistance of the U.S. Food & Drug Administration (FDA), to study the effectiveness of its drug, known generically as ruxolitinib.

Ruxolitinib is approved by the FDA for the treatment of myelofibrosis and polycythemia vera, part of a group of rare blood cancers, as well as for steroid-refractory acute graft-versus-host disease.

Ruxolitinib blocks the signaling of cytokine in the JAK-STAT pathway and may be effective in preventing potentially life-threatening cytokine storms and consequent organ failure. Cytokine storm is a severe overreaction of the immune system that can be caused by a viral infection, autoimmune condition, or other disease.

Because many COVID-19 patients with severe respiratory disease, such as pneumonia, have symptoms consistent with cytokine storm and increased activation of the JAK-STAT pathway, it is hypothesized that ruxolitinib may be able to play a role in treating these patients, Incyte reports.

"Our intent is to build on emerging evidence from independent studies to further establish the role ruxolitinib could play in balancing immune response to the infection and therefore potentially improving outcomes of patients with COVID-19-associated cytokine storm," said Dr. Steven Stein, chief medical officer for Incyte, in a statement.

SHIRIN MODARAI, SAMBEE KANDA, ERIC KMIEC AT THE GENE EDITING INSTITUTE

While an Incyte spokesperson said the company could not estimate how long the clinical trial would take, she said "enrollment may be quick, and we intend to share the results as soon as possible after the study is complete."

ChristianaCare looks into treatment of future outbreaks

ERIC KMIEC, Ph.D., director of the Gene Editing Institute of the Helen F. Graham Cancer Center & Research Institute at ChristianaCare, has been leading the New Castle County-based health system's effort to study patients' responses to the COVID-19 virus.

The Gene Editing Institute is well-known in the nation for its work with CRISPR, an emerging technology that allows scientists to examine genetic defects and treat them at a level not seen in prior decades.

"It helps us correct inherited diseases like cystic fibrosis or sickle cell disease, but it will also help us to disable genes that are malfunctioning in cancer," Kmiec says, noting that ChristianaCare's work to date is aimed at lung and pancreatic cancer.

In mid-May, the Gene Editing Institute was contacted by a consortium of researchers at Stanford University, the University of California Berkeley and several biotechnology companies to join an effort that is seeking to determine which genes are responding to a COVID-19 infection.

"That's really the problem in the country right now. Some people who get infected remain asymptomatic while others have a variety of levels of response," Kmiec says.

Researchers will study gene panels obtained from COVID-19 patients, likely through saliva or blood samples, to seek out the genes that may be influencing a patient's response to the virus. Once they can determine the genes, scientists may be able to identify factors related to those genes, such as genetic ancestry, inherited diseases and socioeconomic factors.

If the work is successful, Kmiec says CRISPR tests may one day be able to tell hospitals how an individual patient may fare with the virus early on in their diagnosis, potentially leading to better allocation of resources and treatment of patients.

Because the study will likely require a year of testing of patients, Kmiec says, it is unlikely to be used in response to the COVID-19 pandemic. But because COVID-19 is among the SARS family of coronaviruses, which already saw a prior pandemic in 2002, epidemiologists believe there will likely be more such pandemics in the future where the CRISPR science could be applied.

Kmiec says his team is "cautiously optimistic that we'll be able to come up with something in the next year or so that will help us understand what genes are accounting for the response."

A New Approach to COVID Testing | BY PETER OSBORNE

Scan Delaware Health's plan could help Delawareans return to their lives

A new nonprofit called Scan Delaware Health has approached state officials with a plan that could help Delaware take another big step toward offering statewide testing for COVID-19 and return residents to work safely.

Scan Delaware Health says it can quickly add testing of 120,000 residents per month — starting with front-line health care workers, first responders and high-risk populations like assisted care employees, their families and residents, populations at risk, critical infrastructure personnel and public works employees.

That would double the number of tests the state is now conducting after buying 200,000 saliva tests from Curative Inc. in May in an effort to add 80,000 tests per month.

Scan Delaware Health plans to conduct rapid antigen and antibody testing of all state residents, and is working with providers to expand PCR testing, going beyond those who have had signs or symptoms of COVID-19 to identify people who have previously recovered from the coronavirus and may have some level of protection from subsequent infections.

VICTOR CUSHMAN of Wilmington is leading the project. He's lived in Delaware on and off for more than 50 years, having attended A.I. duPont High School and the University of Delaware. Cushman's resume includes 18 years at IBM prioritizing and managing R&D projects. He has also served on several federal task-force working groups for critical infrastructure protection, pandemic planning (2003/SARS) and cybersecurity.

Cushman says his team wants to take the pressure off Delaware hospitals, the Division of Public Health and commercial labs for high-volume scaling and testing, adding that the test methods that will be used by Scan Delaware Health are not a "diagnostic test." Rather, the purpose is to "improve our understanding of the proportion of the overall population who have previously been infected with COVID-19 as part of ongoing surveillance."

Under Scan Delaware Health's proposal to put people back to work in Delaware — including potentially residents of bedroom communities in Pennsylvania and Maryland — the initial screen would find the people who have the virus, then test them later for antibodies, with some verification at the end before they go back to work.

"In Europe, they call it an 'immunity passport,' and a combination of testing approaches would cost about $150 per person, which equates to what others charge for a single diagnostic test," Cushman says. "And you may be able to get that cost down further if you order in volume. By comparison, businesses in Delaware are losing billions of dollars per day by not being open."

Cushman believes that state government can't solve this challenge on its own, adding that plans created for previous pandemics, like the 2003 SARS playbook, are applicable to today's crisis.

"Businesses need a coordinating hub," Cushman says.


VICTOR CUSHMAN


DR. RAY YIN


JOHN KOLMAN

The Delaware Way: innovation through connections

As is so often the case in Delaware, project momentum was built after a few connections, starting with the state's public-private economic development agency, Delaware Prosperity Partnership (DPP).

"People come to us with these kinds of innovative ways of thinking," says Ariel Gruswitz, DPP's director of innovation. "We are exploring several collaborative Delaware-based innovation projects that could deliver solutions for the pandemic's challenges. Despite the negative impacts of the pandemic, I see an opportunity for the state's unique strengths in life sciences, digital technologies and data analytics to deliver solutions locally and globally."

Helen Stimson, who recently left her role as president and CEO of the Delaware BioScience Association to become chief operating officer at Incyte, connected Cushman with scientific and technology resources that are providing different pieces of the puzzle, including:

- *ANP Technologies*, which was spun off from the U.S. Army Research Laboratory in 2002, has developed two tests that don't require reagents: a nasal swab test for antigens and a serological (blood) test for antibodies that can be compared to a pregnancy test, says **DR. RAY YIN**, founder and president of ANP, which is conducting clinical trials in California and continues to work with the Department of Defense.

- *QPS*, a global contract research organization located in the Delaware Technology Park, specializes in building novel laboratory tests which are then used by clients to support new drug submissions to the FDA, says **JOHN KOLMAN**, the company's vice president. QPS has developed additional capacity for hospital-grade PCR testing, adding


JENNIFER HORNEY


RANDY FARMER

15,000 tests per month and working around supply constraints.

• *Delaware Health Information Network (DHIN)* will provide central coordination of records through an electronic network used by hospitals, physicians, labs and other clinical entities to quickly and securely exchange clinical results and reports. DHIN is currently working to obtain approval to support the Apple/Google contact-tracing application in Delaware.

• *Jennifer Horney*, a University of Delaware professor and founding director of UD's epidemiology program, has trained rapid-response teams in the United States and around the world to respond to outbreaks of novel and re-emerging diseases. The university's Disaster Research Center, where Horney is a core faculty member, is leading efforts to collect information about community impacts and adaptation.

• *CompassRed* will provide analytics and predictive analysis that will be crucial to informing the testing and communicating the progress, says Founder Patrick Callahan, adding "whether it be machine learning that alerts to higher levels of immediate risk, analytics to support the facilitation of interventions, or simple analytics to inform all parties of current rates of infection, data and analytics will need to be at the core of the solution."

Cushman says ANP's tests are critical to quickly identifying the infected, along with those who have immunities. He adds that QPS can deliver scale and additional capacity to testing in Delaware with an approach that does not rely on material shortages currently hampering testing across the country. And finally, Cushman says, Horney's experience in moving from testing to scale and evaluating the data from an epidemiological viewpoint is a "rare find to have in Delaware."

Building a better mousetrap

Cushman and Yin came together on the project in a particularly "Delaware way." After Cushman approached Stimson with his idea, she suggested he reach out to Yin.

The two were already friends whose children were classmates at Tower Hill School, but they had never discussed the projects they were working on.

"Victor has tremendous energy and enthusiasm, entrepreneurial experience, and experience with SARS," says Yin, who has been working on rapid biothreat detection for nearly 25 years. "Our role is to put our best technical effort behind doing this. We all live in Delaware and we do not want our neighbors getting sick. I'm a test developer and I want my home state to get tested. We're basically ready to launch."

The same rapid tests developed by ANP are also being extensively tested by the U.S. Department of Defense right now, after which a production contract will follow. Yin says the group's test is far more accurate than the temperature tests that people get at airports and their workplaces.

"We can't afford to wait for a 100 percent solution to reopen Delaware," Yin says. "Instead, we need to start testing Delawareans immediately with a combination of PCR, as well as rapid antigen and antibody tests so that we will know where the current and past infected people are, and the rate of spread."

Ensuring test accuracy, data security

"We do a lot of work with clinical testing, which is heavily regulated by the FDA, and we work a lot with antibody-based drugs like Humira," QPS's Kolman says. "We've built out our facility to enable us to run the needed clinical testing for pharmaceutical companies who are developing vaccines. We have also worked hard to get the necessary processes and approvals in place to allow us to test COVID patients. The pieces are in place."

Achieving the scale that Scan Delaware Health hopes to achieve is "difficult but not impossible," Kolman says. "This is in our wheelhouse. The raw materials for these tests can be difficult to get your hands on. But, since we are a service provider and built our own tests, we don't depend on the same supply chains as others."

Data from the tests would be secured and delivered by DHIN, which maintains lab, medical and test records for all Delaware residents.

DHIN shares data with the state Department of Health and provides reporting out to doctors, hospitals and the greater medical-care community. DHIN also offers an online portal to patients so they can have access to their medical results and messages in the community health record.

"The initiative is ambitious. It's inspiring as well as daunting in its scope and scale," says DHIN Chief Operating Officer **RANDY FARMER**. "We have to help support and explore these ambitious initiatives if we are going to get things back to normal."

Farmer says that while nine out of 10 ideas like this don't happen, he's more optimistic about the Scan Delaware Health initiative. "This is clearly a full-court press and a full-team effort. But coordination and engagement with the Division of Public Health is central to everything that is done in this space."

"This is a time when you leave no stone unturned," says Bob Perkins, executive director of the Delaware Business Roundtable, a consortium of state business leaders. "Testing will drive consumer confidence, and you can see all the things that will change if we can figure out testing."

Keeping Health Care Workers Safe

ILC Dover supplies life-saving respirator system

ILC Dover has added 40 people over the past two months to meet skyrocketing demand for an air-purifying respirator system that front-line health care professionals use to treat COVID-19 patients in quarantine wards across the United States.

"We've seen over a 1,000 percent increase in demand over the past year, most of it in a four-week period," ILC Dover President and CEO **FRAN DINUZZO** says. "We didn't have enough raw material supply, space or people to meet that demand, so we pivoted our organization to first fix our supply issue."

ILC Dover's Sentinel XL respirator system is comprised of a blower, filters, a hood, and a hose that connects the blower to the hood. The Frederica facility produces some components and does final assembly. When demand far surpassed supply and the long offshore supply chain for hoods made it impossible for the company to meet that need, the team had to look inside its four walls for a solution that resulted in the Sentinel XL EZ BioHood.

FRAN DINUZZO

"The engineering team looked at what we had around the building that would work for the hoods, designed a new product, tested it, got approval from the National Institute for Occupational Safety and Health in five weeks — NIOSH approval itself normally takes a few months — and started shipments," DiNuzzo says.

DiNuzzo says ILC Dover is producing three to four times more respirators today than it was in January and ramping up to near 30 times January's rate. He expects the need for the company's system will continue even as the need to protect health care workers in quarantine labs diminishes.

"It appears as if demand peaked in mid-April," DiNuzzo says. "Between resupplying hospital stocks, resupplying the reserves the federal government maintains, and the need to replace components like hoods, batteries and filters, we believe demand and production capacity will stay high until a vaccine is identified and distributed and we can't project when that will happen."

DiNuzzo says ILC's products are used in a hospital atmosphere that requires significantly better filtration than the N95 mask.

The 40 new employees have been hired on contract as most production-team members are. ILC Dover seeks to move those temporary employees to permanent, as it's doing now with another 25 to 30 people in Frederica.

The 73-year-old company employs about 450 people in Frederica, and more than 7,800 in six facilities in North America, Europe and Asia, and is perhaps best known for making space suits that outfitted every astronaut in the Apollo program, including the 12 who have walked on the moon. It was sold in February to New York-based New Mountain Capital, an investment firm with more than $20 billion in assets under management, although the leadership team has stayed on.

Tracking COVID Across State Lines

BY PETER OSBORNE

LabWare collaboration with Tangen promises faster testing results, easier data-sharing

LabWare, the leading global provider of enterprise software for testing laboratories, has created a COVID-19 test kit that will help states and hospitals eliminate the paperwork at collection sites, reduce the turnaround for test results, and streamline distribution of the results.

The company, which was founded in 1987 by **VANCE KERSHNER**, is working with a Delawarean-led Connecticut company called Tangen Biosciences to build on the strengths of LabWare's new field collection kit and roll out a portable laboratory that will reduce the wait time for results to just minutes, aiding efforts to stem the spread of the virus.

"Everyone is talking about the need for testing," Kershner says. "But very few people are talking about data collection and the lack of interface nationally."

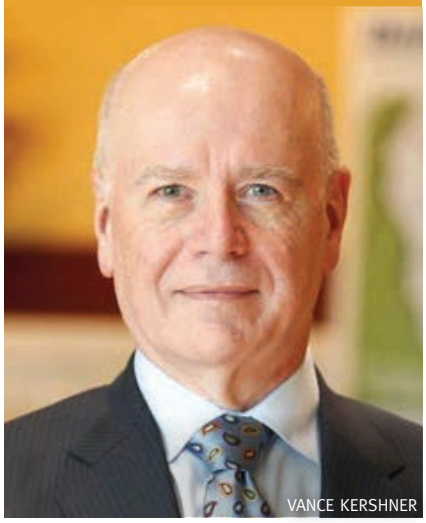
This type of coordination around data is especially important as many states have relaxed social distancing restrictions.

"Timely and complete surveillance data is key to controlling further spread of COVID-19 and quickly tamping down any clusters to prevent a full-blown second wave of infections as people begin to travel more," says Jennifer Horney, professor of epidemiology at the University of Delaware.

In other words, this solves a key underlying problem: Viruses don't stop at state borders but right now, data does. It also reduces the paperwork challenges tied to explosive growth in COVID-19 testing.

Implementing the LabWare kit and the Tangen GeneSpark instrument could help public health departments monitor the spread of the disease and decrease the number of infections in their communities. In addition, states like New York needing to process a high volume of tests will be able to send them to less busy places across the United States and get their results back within three days, with copies to the U.S. Centers for Disease Control and Prevention and state health organizations done electronically as soon as results are completed. LabWare's solution can be used independently with any testing system, enabling it to be utilized nationwide, or even globally.

"After 9/11 happened, there was a concern about bioterrorism, so the federal government gave money to each state to


VANCE KERSHNER


RICK BIRKMEYER

put in a good information management system for public health. But they didn't require them all to use the same system," Kershner says, explaining that Florida, Delaware, Texas, Oklahoma, South Dakota, New Mexico and Utah chose LabWare and will get first crack at the new test kits.

"Every single person who sees what we have thinks it's useful, particularly for surveillance work," he says. "We know that all 50 states have these issues. Our focus right now is on testing. We thought the hard part would be building this thing. The hard part is communicating that we have it and getting the word out to the states that are in triage mode and need back-end data management."

Adding Tangen into the mix

Tangen's CEO is **RICK BIRKMEYER**, who founded Claymont-based CD Diagnostics and is a general partner for Delaware's Leading Edge Ventures with Kershner, Mike Bowman, Jeff Davison and Doug Petillo.

"Molecular tests will tell you if you're carrying the virus right now — that you're either a carrier or you're going to get the disease or you have the disease," Birkmeyer says. "We'll be able to tell people immediately to go home — unless they're having breathing problems — and stay isolated."

Tangen is one of the few companies that have been working on a handheld point-of-care instrument, which is far more sensitive and exact in finding the sequence of the virus in RNA, a type of genetic material within a virus.

While the current instrument will only be able to test for COVID-19, Birkmeyer expects that by early next year, the company will be able to test for all major viruses — including cold and flu viruses, swine flu, COVID, MERS and SARS.

Today, most COVID-19 test results arrive in two to four days from commercial labs, such as LabCorp or Quest Diagnostics. With the Tangen instrument, the results will be ready in 20 minutes and can be communicated to patients while they wait, so infected patients can immediately self-quarantine to reduce the risk of spreading the virus.

LabWare is working with the Florida Department of Health to test its system, which uses iPads that are tied to a mobile hotspot with password-protected Wi-Fi, and includes a battery pack, a thermal bar-code printer and label stock. Ultimately the kit will be available with the Tangen GeneSpark Analyzer and COVID-19 assays.

"Florida started with three kits in Jacksonville and Duval County and has now ordered 150 of them for all 67 counties," Kershner says. "Procurement could be a challenge in the current environment, but we're wholly committed to fulfilling this order and ramping up for the quantities we are expecting"

Connections matter: The Delaware Way

Kershner was at a Tangen board meeting when he learned about the federal Biomedical Advanced Research and Development Authority's interest in a COVID-19 solution based on its previous experience with Tangen on an anthrax test. That got him thinking.

"They really weren't prepared for commercialization," Kershner says. "And then one day I realized that if you're going to test in the field, you need to be able to keep track of data with an information management system like ours."

Kershner reached out to Delaware's two senators, showing Sen. Chris Coons a prototype a week after they sat down for coffee. Sen. Tom Carper jumped all over it and helped with a lot of calls, Kershner adds. Finally, Florida said it would be a partner to help LabWare understand the requirements for testing in the field.

"We need to be able to test quickly and accurately, and then collect and share that data across states," Carper said in a statement. "Delaware's own LabWare is on to something here, and my hope is that their testing phase is successful so their product can help us through this crisis."

The LabWare development team took their kit to Florida in mid-April and they immediately said it would solve a problem for the state.

"Everything was on paper with multiple touchpoints," Kershner says. "It was taking 20 minutes at a drive-up testing facility to fill it out, with three people wearing PPE and using clipboards before moving on to a second station. The forms were then sent to a lab and transcribed and in many cases the handwriting was not matching up with the records. Our software eliminates all that and we created a mobile application that the whole thing is now running on."

The pairing of LabWare and Tangen offers immediate possibilities and farther-reaching opportunities should the virus return this fall or next year. The Tangen test will cost about half what other tests cost and patients will get 10 results versus one.

"Our test will be the gold standard," Birkmeyer says. "Before next flu season, we will have it so all the instruments can be reused and reduce the cost. Vance is enabling us to pull up to a mobile sampling place and record that person's data and send it with the sample to a lab and find hot spots. Combining the two technologies means we can go out to a nursing home, check everyone, see who has COVID versus flu A or flu B, and communicate that immediately to the state lab.

"It's a fantastic way to stop the spread because it prevents people who may have a positive COVID-19 test from wandering around and infecting everyone else."

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UNIVERSITY OF DELAWARE

Delaware Companies Are Providing Materials to Front Line Workers

BY DORA CHEATHAM

From chemical manufacturers to pharma companies, advanced materials to agrisciences, Delaware companies are doing what they can to keep their employees safe while adapting to today's needs.

Says Erica Nemser, CEO of Compact Membrane Solutions: "As a company, we are all just trying to roll with the punches, do what we can to help in this time of crisis, keep our employees employed, and stay close to our customers and suppliers."

While Dogfish Head Brewery has garnered well-deserved attention for pivoting to hand-sanitizer manufacturing, what fewer people realize or recognize is quite how many Delaware-based companies are quietly contributing to the critical COVID-19 value chain, more often than not operating on a skeleton staff.

Companies like DuPont, Croda, Dow, Air Liquide, Solenis — all with a presence here in Delaware — are doing their part to adapt their manufacturing output to support not only those on the front lines of the crisis, but also the health and wellness of the rest of us.

Another of these companies is Ashland. "Many of Ashland's manufacturing sites produce specialty ingredients used in pharmaceuticals, personal care items, household products and nutritional, food and beverage products," says Guillermo Novo, chairman and CEO. "As such, our employees and manufacturing plants play a vital role in maintaining health and other activities necessary during a global pandemic response."

Dow, which supplies materials for products such as sanitizers, disinfectants and PPE — is ramping up production of hand sanitizer in Michigan, West Virginia, Belgium and Brazil, as well as repurposing existing Dow facilities, while DuPont is significantly increasing production of the most needed PPE garments, with its

DORA CHEATHAM | MOONLOOP PHOTOGRAPHY

Tyvek® operations running 24 hours a day at 19 production sites in nine manufacturing facilities throughout the world. These facilities are currently producing more than 9 million garments per month and prioritizing the needs of front line workers.

Croda products are critical supply-chain materials in the manufacture of sanitizers, medicines and medical equipment, protective medical products and items used in the COVID-19 testing kits.

Air Liquide is increasing production and inventory of essential medical gases, while its subsidiary Air Liquide Medical Systems began tripling its production capacity to produce 1,000 ventilators. In additional, the company partnered with Groupe PSA, Schneider Electric and Valeo, to take up the challenge of producing 10,000 ventilators in just 50 days.

Meanwhile, as we walk around the supermarkets with empty shelves that should normally be holding toilet paper, yet another Delaware-based company — Solenis — is a key value-chain supplier through its tissue and towel product line.

Among Delaware's smaller companies, Halosil's HaloMist™ — which forms part of its whole-room disinfection system – has been added to the EPA's List N for products with emerging pathogen and human coronavirus claims for use against SARS-CoV-2.

These are just a few — there are many more companies that are doing their part and not mentioned here. The priorities for companies are simple: Employee safety is first and foremost, followed by adapting to a new status quo.

Says Tim Mueller, VP of Operations at Delaware Innovation Space: "These are not typical business-driven outcomes. These are groups of scientists and technologists innovating and adapting to solve a problem. Every one of these outcomes is based on science and technology and it talks to where the country has to go to solve this crisis." DESCA would like to acknowledge these scientists and technologists that assess their core capabilities and adapt them to provide innovative solutions that address immediate, critical problems.

Emerging from the crisis — what next?

What will follow as we emerge from this crisis remains to be seen. Will the implementation of digital transformation as a means to reduce costs and increase value be accelerated? Can advanced analytics be used to inform future activities based on the learnings from this crisis as well as standard operations? Will remote working become more prevalent in the chemical industries and if so, how do companies ensure cybersecurity throughout their organization in what may become a new normal?

We ask you to join DESCA as we launch efforts to facilitate and discuss strategies for the chemical industries post-crisis, and let us know which discussions you'd like to engage in.

In the meantime, as Ms. Nemser says, "we are all just rolling with the punches."

Dora Cheatham is executive director of the Delaware Sustainable Chemistry Alliance (DESCA).

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THE HOMES OF INNOVATION

In the beginning, there was DuPont.

The gunpowder and chemicals giant transformed Delaware's economy starting in the 1800s, but its role began to diminish with the massive downsizing and restructuring of the late 20th century.

From those ashes emerged a new, more diverse innovation economy, headed up by the dozens of businesses started by former DuPonters, in sectors ranging from chemistry to advanced materials to bioscience to tech. The entrepreneurs leading those companies still bring their innovation know-how, first learned at DuPont, to work every day. Read about that legacy on *page 26.*

Another prime example of how Delaware ingenuity has turned loss into gain is the University of Delaware's Science, Technology and Advanced Research (STAR) Campus. One year after the last Chrysler rolled off the line at Newark's big automotive factory in 2008, the University of Delaware purchased the site. Over the past decade, UD has transformed it into STAR Campus, a home for innovative research and businesses that's still growing in leaps and bounds, as you'll see on *page 32.*

Innovation continues to find a home in Delaware with a robust and growing scene of entrepreneurship competitions. On *page 38,* learn more about how Delaware's strong spirit of collaboration helps make those competitions more meaningful.

How corporate layoffs kickstarted Delaware's innovation economy

BY KEN MAMMARELLA

THE DUPONT LEGACY

MOONLOOP PHOTOGRAPHY

When the DuPont family and its company transformed Delaware in the 1800s and 1900s, it seemed as though the company's legacy would lie in gunpowder or chemicals.

But serial entrepreneur Ben duPont, for one, has posited that the company's legacy may in fact be found elsewhere: with the number of new companies that have been formed since corporate layoffs began at DuPont in the early '90s.

As far as Wall Street is concerned, the most important part of the DuPont corporate family tree involves the 2015 merger with Dow and subsequent split into firms specializing in agriculture (Corteva), specialty products (DuPont) and material science (Dow). But the legacy of companies created from DuPont or by DuPonters dates back much earlier, with companies started by energetic entrepreneurs offering immense potential for Delaware's economy.

DuPont's downsizing, selloffs and massive restructuring "created many small spinoff companies, plus innovative scientists and businesspeople who left to start their own new businesses," says Mike Bowman, president and CEO of Delaware Technology Park, who counted 31 such ventures as far back as 2007. "That is not all bad, as it becomes a 'reseeding' of the economy if they stay local — as did Incyte, QPS, GE Aerospace and others."


BEN DUPONT


ERICH PARKER


PAULA SWAIN


DEBRA MASSOUDA

"My ancestors were entrepreneurs, and one of the remarkable things about the company was its ability to change," Ben duPont says, referring to the firm's pivot from gunpowder to chemistry to science. "There was a combination of chemistry and an entrepreneurial way of thinking."

Through its field engineering program, the company nurtured **BEN DUPONT** and several hundred new hires a year on their career and mindset. The program, which involved postings in different cities and departments, developed generalists capable of creative thinking, he says. "DuPont wanted to make the world a better place, and Delaware a better place in the process."

That philosophy thrives today among former employees who are leading and creating companies in and near Delaware.

Spinoffs keep innovation going

The legacy of companies coming from DuPont goes back to at least 1912, with the creation of Hercules and Atlas, after the government forced DuPont to split up its explosives business. Following mergers and new names, Hercules does business as Ashland Global Holdings on Hercules Road, and Atlas works on pharmaceuticals as AstraZeneca in Fairfax.

Another early DuPont spinoff is W.L. Gore & Associates, founded in 1958 by ex-DuPonter Bill Gore and his wife Vieve. Gore, headquartered in Newark, is known for Gore-Tex and other innovations in polymers, backed up by 5,500 patents.

Siemens Healthineers, with operations south of Newark, and Agilent Technologies, with operations outside Wilmington, both have DuPont roots.

Chemours spun off from DuPont in 2015. Today, the company is known for its "world-class, problem-solving chemistry," says **ERICH PARKER**, once DuPont's global director of corporate communications and now Chemours' senior vice president for corporate communications and chief brand officer. "It is the foundation of our own research and development now centered in our new Discovery Hub adjacent to the University of Delaware campus."

The $150 million Hub keeps 330 research jobs in New Castle County, Chemours says. It's a long-term partnership with the university, and it helps Chemours fulfill its promise to meet emerging customer needs, satisfy new market demands and deliver higher-value chemistry.

Incyte is a biopharmaceutical firm that set up Delaware operations in 2002 and is now based just outside Wilmington. "DuPont Pharmaceuticals' focus was on research and development and innovation," says Executive Vice President of Human Resources **PAULA SWAIN**, a founding member of Incyte. Swain was one of many ex-DuPonters who wanted to stay in Delaware when DuPont Pharmaceuticals was sold. "As we started Incyte, we sought to continue [DuPont's] drive and commitment to innovation. We built a first-class drug discovery engine based on how we had conducted research at DuPont; we hired, and continue to hire, very experienced chemists and biologists who feed the product pipeline we have today; and we maintain the belief that good science drives the discovery of good medicines that ultimately lead to new and pioneering treatments for patients."

Incyte's impact on Delaware's research landscape has been tremendous. "Incyte is frankly bigger than Gore," says Bowman. Incyte leader Paul Friedman, he adds, "is a genius in drug discovery and had a team that followed him."

"As with many organizations, as DuPont Pharma grew, so did its infrastructure and

processes," says Swain. "At Incyte, our aim has been to establish a culture and structure that fosters creativity, innovation and risk-taking [while eliminating] bureaucracy. By working in cross-functional teams and reducing layers of management, Incyte has remained nimble and able to successfully drive innovation."

STRIDE began as a Delaware nonprofit in 2016, started by a group of 100-plus scientists from DuPont's central R&D; it now also has a for-profit subsidiary. STRIDE CEO **DEBRA MASSOUDA**, a 25-year former DuPont

INCYTE

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STRIDE

ZAMAS LAM

JEFF FETTERMAN

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

SCOTT PEACOCK

RASHI AKKI

employee, says an important lesson from DuPont rose from handling disparate projects. "It's a way of lateral thinking. How is this new project like what we did before? It's also a way of bringing different ideas together to be inventive."

STRIDE — which stands for the Science, Technology and Research Institute of Delaware — operates out of a DuPont Experimental Station building run as an incubator by Delaware Innovation Space. As a smaller concern, "we're closer to the customer than DuPont," Massouda says, and therefore faster to adapt to the market. "And the market is telling us there's growing interest in materials science."

Entrepreneurs apply DuPont's lessons

Beyond spinoffs, DuPont's legacy can be felt in the lessons learned by the many First State entrepreneurs who cut their teeth there.

QPS, a Newark-based contract research organization supporting drug development, began in 1996 with three people, all DuPonters, and today employs 1,200. **ZAMAS LAM**, senior vice president and global head of business development at QPS, says he learned disparate skills during four assignments and eight years at DuPont, all helping him to lead QPS as it grows.

Lam says DuPont called itself

QPS

"lean, green and mean, yet it was none of them." By contrast, QPS is "lean, green and focused."

JEFF FETTERMAN's 18 years at DuPont taught him three types of know-how: leadership, domain-specific and general business. "DuPont had great people, and I learned a lot from them. Not all other businesses work with the same degree of professionalism," he says, adding that those skills included conceptualizing a project and getting it done, and navigating regulatory agencies. He used those skills to co-found and sell two companies, Empower Health and ParagonRx. Since then, he's been consulting, leading a private equity firm and volunteering those business skills.

SCOTT PEACOCK, who began at DuPont Central Research & Development in 1984, started an analytical chemistry business as a side gig in 2010. "With the upheaval at DuPont in 2017 and the year-over-year growth of [my company] First State IR," the Hockessin resident chose to retire from DuPont and devote his time to his firm.

"I learned so much during my tenure at DuPont, it's tough to put into words. I had the privilege of working with brilliant, world-class scientists from all over the globe who taught me more than could ever be learned in an academic setting," he says. "Beyond that, the continuing development of 'soft skills' was priceless. Problem solving, troubleshooting, data-based decision making, juggling multiple priorities and appreciating diverse cultures are just a few of the skills that I will always carry with me."

RASHI AKKI credits her 20 years at DuPont with the broad skill set she needed in 2014 to found Ag-Grid Energy, which ferments manure and food waste to produce power. "The only reason I could do it was my experience at DuPont," she says, ticking off sales, project management and business plans.

CECON was founded in 1985 by DuPonters, mostly engineers, according to ex-DuPonter Sam Waltz, who bought the Newport-based consultancy in 2019. Whenever he's with a group of former DuPonters, he recognizes "a similar behavioral pattern built on direction, built on an engineering mandate and built on a planning ethic. It's part of the water, part of the culture."

WHY *move* TO DELAWARE?

Out-of-state entrepreneurs share why they chose to relocate their businesses to the First State.


DOUG GODFRIN

DOUG GODFRIN
Founder and President
Veramorph Materials

Q: What does Veramorph do?

We design a special type of polymer material for use in pharmaceuticals. Specifically, we design them to improve the body's ability to absorb the active ingredient in a therapeutic product. So … these polymers improve performance and also help our customers, which are primarily pharmaceutical companies, to develop their products faster so they can get them to market in shorter timelines. And we do all of that now at the Delaware Innovation Space, which is where we have our lab.

Q: When did you move to Delaware, and why?

We moved here from Michigan in September 2019. It was largely a result of having won the Delaware Innovation Space FastPass award that was sponsored by a combination of the Innovation Space and DuPont. That was our primary motivation for moving to Delaware — because of the funding support as well as the resources that are available at the Innovation Space, which align very well with what we need to conduct our business.

Q: Why did you decide to compete for FastPass?

I actually found out about it through a friend who worked at DuPont. Where we were located in Michigan had very limited resources. We were near Midland, which is where Dow's headquarters are. … So actually the proximity to the DowDuPont headquarters as well as knowing people who work at DuPont was how I found out about the program in the first place. And that's essentially what had made me aware of the resources available in the Delaware area. I did my PhD in chemical engineering at UD, [but] it wasn't until winning the FastPass award that I became aware that small businesses actually have access to working with UD and their resources at a set cost. It's a very favorable pricing structure. In addition, there are multiple grant opportunities within the state. There's the EDGE Grant which we recently won, and which helps to support product development efforts. But there's also other grant opportunities in the state, such as through the Delaware Biotechnology Institute. And those have a very large incentive to apply for them because it's a one-to-one match. So if the company is already planning on dedicating certain resources to a project, there's an opportunity to reduce the cost by 50 percent by working with local nonprofit research institutions. It's a great asset.

University partners with business, public sector for a thriving innovation hub

BY ROGER MORRIS

STAR CAMPUS HAS A BRIGHT FUTURE

Newark's big industrial loss has turned into that city's — and Delaware's — bigger gain.

When the final Chrysler Durango, just outfitted with a jaunty sun roof, rolled off the assembly line at the company's sprawling Newark automotive plant along South College Street in late 2008, it was a huge blow to the region's economy and its self-image as a Mid-Atlantic manufacturing hub.

The University of Delaware (UD), whose South Campus and athletic complex is located just across the street, was considered a prime candidate to buy the facility, and talks between the two parties had already begun in 2007. About 20 months after those talks started, the university announced on Nov. 23, 2009 that it was now the proud owner of the sprawling, 272-acre facility.

The first thing then-UD president Patrick Harker did was call Delaware Gov. Jack Markell, who had helped lend state support, with the news. The university's press release noted that the preliminary analysis suggested likely candidates for inclusion for this new campus were UD's research partnership with the Army, the Delaware Health Sciences Alliance and several university research centers and institutes.

THE TOWER AT STAR ATRIUM

STAR CAMPUS **BY THE NUMBERS**

STAR CAMPUS OVERALL

4
Major new buildings opening 2018–2021

272
ACRES on site

330
Approximate number of Chemours employees that moved to STAR Campus in 2020

228,000
SQUARE FEET in new Ammon Pinizzotto Center

UD DEPARTMENT OF HEALTH SCIENCES

3,000+
Health Sciences students

40
Research labs at STAR

30
Patents issued since arrival at STAR


MARTHA HALL

Today, with one high-rise facility having opened in 2018, two this year, and a fourth slated for 2021, the university's Science, Technology and Advanced Research — STAR — Campus has far exceeded those meager early expectations.

'Come back when you have the money'

"I came in 2009 when the university was negotiating to buy the site," says **KATHLEEN MATT**, dean of the College of Health Sciences and a major force behind the STAR Campus' growth. "The university was starting to tear things down, and I asked them to save the old Chrysler administration building. Our public health clinics on the main campus had no room to expand, and I thought that building could be a great place for them."

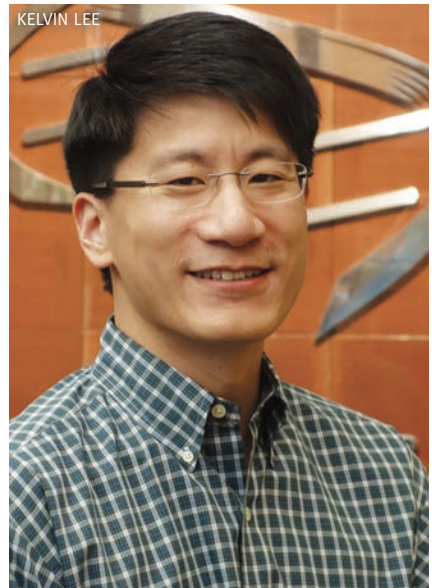
Matt also contracted an architect to see if the present building could be expanded as well as remodeled. She says she was told that "a new tower would cost several million, and the university said, 'Come back to us when you have the money.'" Realizing a public fundraising campaign would take years to complete, Matt decided to try something that had worked for her former employer, Arizona State University, which had a public-private development program with the Mayo Clinic.

"I approached Delle Donne, and they agreed to build the Tower at STAR and then lease it back to us," Matt says. In 2014, the health care clinics moved into the revamped Chrysler building, which is also leased from Delle Donne, and Matt and her Health Sciences innovation and research offices moved into the newly constructed, 10-story adjacent tower in 2018. "The idea from the beginning was to bring the community into the university through clinics and other means," she says.

Most of the traditional classroom activities for Health Sciences are still conducted on the main campus, while many of the department's research projects and clinical training take place at STAR. One of those units is a combination fashion and engineering lab run by **MARTHA HALL**, director of innovation for the department. Using 3-D body scanning, 3-D knitting machines and 3-D printing, the lab can produce personalized prototypes of garments for people with special needs in clothing. "Students get to experiment with hands-on innovation here," Matt explains.

A total of 759 faculty, staff, clinicians and students work in floors 2–7 at the Tower, and another 174 work in the adjacent STAR Health Sciences Complex, including clinicians, researchers, students, faculty and staff. Annually, about 8,573 patients make 28,891 visits to the health clinics.


KATHLEEN MATT


KELVIN LEE

A new home for biopharmaceutical innovation

But the Tower, with its iconic "living wall" composed of 5,000 plants, isn't the most recent addition to STAR Campus; that honor belongs to two other buildings. One is the six-story, 228,000-square-feet Ammon Pinizzotto Biopharmaceutical Innovation Center, which houses NIIMBL — the National Institute for Innovation in Manufacturing Biopharmaceuticals, one of the 14 institutes in the Manufacturing USA network.

"We learned in late 2015 that the federal government was going to host a competition," says UD faculty member **KELVIN LEE**, "and the university led the effort to create the institute here." Lee also serves as NIIMBL's director. One of multiple applicants, Lee's team was awarded the project in late 2016. Currently, NIIMBL members include the federal government and most of the major pharmaceuticals, biopharmaceuticals and medical devices companies.

"We have calls for projects," Lee says, "and the applicants are evaluated for technical merit, potential risk and potential payoffs." As competing companies may be jointly involved in a particular project proposal, Lee says that a decision is made

1938-2020

STAR Campus *Timeline*

1938 Chrysler purchases land for parts depot.

1951 First plant built to produce tanks for the U.S. Army.

1953 Chrysler's 3,000 workers begin full-scale tank production.

1956 Plant is converted for automotive assembly.

1957 Production begins on Plymouth and Dodge vehicles.

1969 186,777 Plymouth Furys, Dodge Polaras and C-body Chryslers produced at the Newark plant.

1997 Paint shop, training facility and test track are added to the site.

2008 Chrysler plant closes.

2009 UD purchases the 272-acre site.

2012 Construction begins on Health Sciences Complex.

2013 Bloom Energy opens

2014 UD's Health Sciences Complex opens. The building includes 20 research labs and two clinics to provide primary care and physical therapy to the public.

before the project is submitted as to how any intellectual property ownership will be divided among the principals. "Then when they get to a certain stage, all projects are published on the NIIMBL website," Lee says. About 30-35 NIIMBL employees will be involved initially.

In addition to NIIMBL, Ammon Pinizzotto is intended to house the university's Department of Biomedical Engineering as well as the Delaware Biotechnology Institute. The building was slated to debut this past spring, but plans for a full opening were suspended amid the COVID crisis, Matt says.

New chemistry, fintech buildings

Another recent addition is the Chemours Discovery Hub, the Delaware-based chemical company's 312,000-square-foot research facility that opened this spring. The building houses around 330 of the company's R&D scientists, according to Chemours Site Manager **HEIDI MARTELOCK**.

"In addition to researching new products," Martelock continues, "we're going to develop new applications for our existing products and work to improve the performance of our products in existing applications. For example, our titanium dioxide is used as a pigment in architectural coatings. So we might conduct experiments to help our customers develop a new type of paint."

Another university school, the Lerner College of Business and Economics, will assume a major presence at STAR in 2021 when the currently-under-construction Financial Services Technology, or FinTech, building is slated to open. A combined project of the university, Discover Bank and Delaware Technology Park (DTP), which already has facilities at STAR, the building will be six stories and house 100,000 square feet of space.

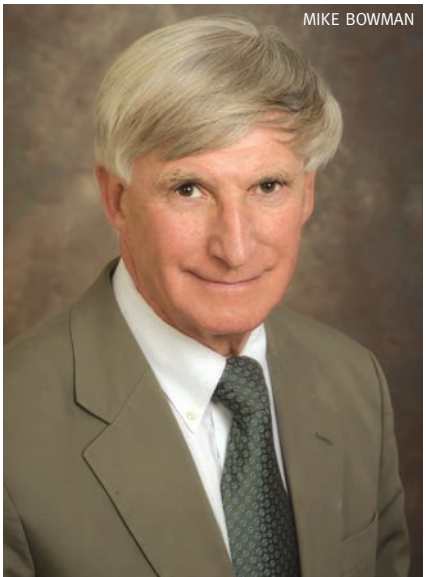
The FinTech building "will contain faculty, students and entrepreneurs with outstanding data science knowledge and digital management competencies as well as support resources for business development and community education," says **MIKE BOWMAN**, president and CEO of DTP. The building will house spaces for startup companies under the aegis of DTP as well as labs and offices for Lerner and for the College of Engineering, UD's Office of Economic Innovation and Partnerships (OEIP) and Delaware's

Small Business Development Center.

Although these four buildings are the newest on the campus, they join older tenants who have been operating at STAR for several years. One is Bloom Energy, the world's leading manufacturer of fuel cells, whose manufacturing facility opened in 2013, and another is SevOne, which provides network monitoring and analytics solutions, and located here in 2015.

Along with Health Sciences, Delaware Technology Park's DTP@STAR unit has been helping to launch new startups that had their genesis at STAR or other parts of the university. Along with work started at DTP's nearby main campus, more than 80 companies have moved through the park since 1992, creating more than 16,000 jobs, Bowman says. More companies are now "incubating" at STAR.

So the STAR constellation continues its dynamic growth with established research corporations, emerging startup firms spawned at STAR, governmental enterprises and facilities to train the students who will be tomorrow's entrepreneurs.



MIKE BOWMAN

HEIDI MARTELOCK

2015	SevOne, Independence Prosthetics & Orthotics and Medical Aid Unit open.
2016	Delaware Technology Park incubator space opens.
2017	Construction begins on the Tower at STAR. Construction begins on Chemours Discovery Hub. Construction begins on Ammon Pinizzotto Biopharmaceutical Innovation Center.
Fall 2018	Ribbon Cutting & Grand Opening of the Tower at STAR Charles Parks statues added throughout Health Sciences Complex & the Tower at STAR.
Fall 2019	FinTech Building announced. Completion slated for 2021, but possibly subject to delay due to COVID-19 pandemic.
March 2020	Chemours Discovery Hub opens. (The full opening of the Ammon Pinizzotto Biopharmaceutical Innovation Center, also planned for spring 2020, has been delayed for now.)
2020	New Newark train station building adjacent to STAR Campus set to open. (Date subject to change due to COVID-19 pandemic.)

Competitions, community support groups are building the next generation of entrepreneurs

SEEDING THE INNOVATION ECONOMY

BY LARRY NAGENGAST

Competition and collaboration might seem like mutually exclusive concepts. But within Delaware's expanding entrepreneurial community, there's plenty of room for both, with strong collaborative bonds helping to make competitions more meaningful.

The latest iteration of Delaware's collaboration-competition blend is neoFest, a daylong combination entrepreneurial summit, startup competition and innovation showcase. Set to make its debut May 7 at the Chase Center in Wilmington, the conference was cancelled due to the coronavirus outbreak. However, the get-together is now being planned for spring 2021.

NeoFest was set to include the finals of the University of Delaware's Hen Hatch competition, giving UD's blossoming entrepreneurs more exposure than ever before.

"It's more than just a competition. It's about learning, about connections, about meeting potential customers," says **VINCE DIFELICE**, who coordinates Hen Hatch through UD's Horn Entrepreneurship program.


VINCE DEFELICE


ZACK JONES


GARRY JOHNSON


SCOTT MALFITANO

Schools see these competitions as a great way to engage students. And the students themselves, who have grown up watching television shows like "Shark Tank" and "The Apprentice," see them as "a natural state of being," says **DAN YOUNG**, director of the Doctor of Business Administration program at Goldey-Beacom College and moderator of the school's Startup Grind, an entrepreneurial support program that, among other things, helps students prepare for pitch competitions.

Supporting entrepreneurship at all levels

Opportunities start early in Delaware, beginning with the Diamond Challenge, a competition for high school students run by the Horn program. Now in its eighth year, it's actually international in scope, drawing entrants from 70 countries and 40 states since its inception. Lately, more than 700 teams have entered annually, with the best 70 or so submissions being invited to the finals at UD in mid-April, according to **JULIE FRIESWYK**, assistant director for youth programs at the Venture Development Center of the Lerner College of Business and Economics. Most teams show up, even if they have to travel halfway around the world. And why not, when they can compete for a share of $100,000 in cash prizes and in-kind technical support?

Delaware usually has a strong presence, Frieswyk says, largely because of growing entrepreneurship programs at the Charter School of Wilmington, Newark Charter School and Ursuline Academy, among others. Participants in the Dual School, a Wilmington-based experiential learning program that draws from several public and private schools, have also entered their social impact projects in the Diamond Challenge. In addition, some Dual School students have startup grants from two national programs, PeaceFirst.org and the GripTape Learning Challenge, according to Dual School head **ZACK JONES**.

At the college level, Hen Hatch is the big name in Delaware, drawing a total of about 100 applications a year from two groups: UD students, and UD alumni, faculty and staff, DiFelice says. The six finalists — three from each group — vie for a total of $100,000 in prizes; a mix of cash and services, usually marketing, legal or accounting.


JULIE FRIESWYK


DIAMOND CHALLENGE PARTICIPANTS

Competition isn't at the heart of every entrepreneurial promotional program.

At Goldey-Beacom, Startup Grind is part of a global community with more than 600 chapters, giving students access to advice and networking opportunities well beyond the Pike Creek campus, Young says. But much of the activity occurs in and around the college, with business owners visiting to speak with students and students offering their skills, often in coding, social media and videography, to support newer local businesses that need help in those areas.

"It's more an entrepreneurial support organization than a competition," Young says. "A student can say 'I'm a coder,' and hook up with an entrepreneur who needs help with coding."

Extending access to the community

Other initiatives, like First Founders and Reinventing Delaware, extend beyond campuses.

First Founders, launched last year by Horn alumnus **GARRY JOHNSON**, is a 12-week business accelerator that aims to boost individuals who have struggled to find a home in the entrepreneurial marketplace, especially women, people of color and members of the LGBTQ+ community.

"People in underrepresented groups are really getting the crumbs," he says. "We're trying to push the needle, make a difference in the world."

The 2019 cohort had eight participants who met at the Route 9 Library near Wilmington for four hours on Saturdays and for an hour in the evening once or twice a week. This year, Johnson had 30 register.

While last year's participants had a

JIM COARSE/MOONLOOP PHOTOGRAPHY

DAN YOUNG

variety of projects, including development of a hair-care product line and a video game to help young people learn about mental health, Johnson hopes to concentrate his efforts in the fintech sector, all the better to make connections in a growing Delaware market.

Reinventing Delaware, a project of the Pete du Pont Freedom Foundation, fosters collaboration to make Delaware a better place to live and work. The Foundation invites 100 people to a dinner each year, sets them up at 10 tables of 10, and gives everyone five minutes to pitch an idea at their table and answer questions. When they're done, they select the best idea from each table, says **SCOTT MALFITANO**, the CSC vice president who chairs the foundation.

The foundation's board then vets the ideas and chooses five to receive six months of consulting services. Previous winners have included: Zip Code Wilmington, a coding boot camp; The Warehouse, a community center for Wilmington teens; and Second Chances Farm, a hydroponic agriculture program that trains ex-offenders for meaningful employment. In the past, Reinventing Delaware has awarded one $10,000 grant a year, Malfitano says. Starting this year, it will choose two winners.

While competitions may offer prize money, that's not necessarily their biggest reward, DiFelice says.

Ideas that win at these pitch fests don't necessarily turn out to be winners in the marketplace, but participants make valuable contacts, secure mentors and get professional advice as they develop their projects, he notes.

"You learn how to solve problems, you see what your value is," he says, and that brings the real payoff, "finding a job that is better aligned with your interests and your passion."

WHY *move* TO DELAWARE?

Out-of-state entrepreneurs share why they chose to relocate their businesses to the First State.

MEZAUN NORMAN, CEO • **TeleFix Technologies**

Q: What does TeleFix do?

We are an advanced wireless solutions provider. We pioneered a digital, cloud-based ecosystem we call WALLACE. WALLACE re-imagines and digitizes field service workflows and workforce management to solve quality issues and simplify service delivery management for telecom companies. It functions in multiple environments and industries. We have established significant partnerships and contracts. We're trying to scale here in Delaware and create new jobs. We're actively hiring field techs for a new project to build 5G networks as well as deploy our platform. Today, the pandemic crisis has expanded the need for massive wireless and internet connectivity. From this, we now have to fill multiple positions ranging from tech, software development, hardware, leadership and operations to field and tower technicians in telecom. All are remote. In health care, we would like to help connect remote expertise to bridge skills gaps and worker shortages and connect patients with loved ones remotely and privately.

Q: When and why did you move to Delaware?

We were founded in Dallas and we moved to Delaware in 2018. We came up here for the summer to visit relatives and find health care for a family member. We started doing some research to position our HQ. I wanted the quality of life, culture and great benefit packages for everyone, and I found that here, so those were some of the key reasons. Upon meeting with Delaware Prosperity Partnership, the incentives to position here were attractive, so it made sense to scale, hire and find good health care for everyone.

Q: What do you like about living and working in Delaware?

I'm a beach person, and people who like the beach will love it here. The East Coast is part of our market, so Delaware's positioning is a really good strategic geographical point. We also do not have extreme weather situations, such as hurricanes and tornadoes, as much in Delaware. But mostly, it's a good location. We can get to DC in two hours, to New York in two hours. We're right around the corner from Philly. It's great to have a smaller place to launch as opposed to being in the big city where you're just a number and then it's harder. Here, we can test a smaller proof of concept, then branch out. It's more manageable. It'll be nice to be part of helping Delaware meet its initiatives of becoming more technologically advanced and attract new faces and jobs in tech entrepreneurship.

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WHAT'S NEXT?

Moving from Startup to Established Innovator

So you've got a great idea and you're ready to turn it into a thriving, growing company. Good news: Delaware is the perfect place to do it.

Delaware's network of state grants, incentives and tax credits already includes major competitive advantages for innovators, such as the Research & Development Tax Credit. Most recently, the state has launched the EDGE Grant program, which provides up to $100,000 to STEM companies in need of a hand up. On *page 44,* read more about how the First State supports innovators, and how state and federal incentives can be stacked for maximum benefit.

Government incentives stand alongside a growing landscape of angel investors and private funds, as you'll see on *page 48.* That landscape includes the Delaware Innovation Space's First Fund, which offers a combination of cash and material support — such as lab space — that can make all the difference in reaching the next stage of growth.

The third leg of support for innovators is Delaware's court system, most notably the Court of Chancery. Delaware's courts are second to none in the nation when it comes to helping entrepreneurs defend and protect their intellectual property. Turn to *page 52* for more.

Getting to the next stage is also a matter of internal factors — most importantly, company culture. On *page 55,* ILC Dover and DuPont share how their culture drives a climate that's conducive to innovation.

Delaware has another, less tangible but no less important benefit for innovators: a deep bench of experienced entrepreneurs willing to mentor founders and connect them to the help they need to thrive. Read some of those First State-typical mentoring stories on *page 58.*

HELPING BUSINESSES GROW

BY MICHAEL BRADLEY

How Delaware's grants, incentives and tax credits support next steps for innovators

No one can accuse **DAMIAN DESTEFANO** of having small goals.


DAMIAN DESTEFANO

The Director of Delaware's Division of Small Business has been on the job just under two years, but he has a clear vision for what he wants the department to accomplish and where he wants Delaware to be on the national scene when it comes to emerging companies.

"Our number one goal is to support the entire [business] community across all industries and make Delaware the number one state in the country to start and grow a new business," he says.

DeStefano and his staff assembled a network of organizations capable of providing support for entrepreneurs, in addition to the financial assistance that is available. The result is a strong ecosystem that gives those who need it capital infusions, technological expertise, organizational aid and help with the regulatory requirements that can create headaches at the outset for any new concern.

It's part of a state-wide desire to create a climate in which small businesses can thrive, particularly in the tech sector. As the national economy continues its sturdy growth, it is important for Delaware to help those looking to find their places in it. The Division of Small Business has plenty of ways to do that.

STACKING INCENTIVES CAN MAXIMIZE TAX SAVINGS

When business owners come to Myunghee Geerts looking to "stack" tax credits and other incentives available from the state of Delaware, she helps them build a veritable tower.

"Delaware has been very good in supporting entrepreneurs and creating an ecosystem for technology," says Geerts, a principal at the Wilmington-based CPA firm Cover & Rossiter.

One example she gives is the Main Street Wilmington Program, which is designed to bring more businesses downtown. Those entrepreneurs looking to settle there can take advantage of a slew of credits, provided they locate their businesses in areas designated to produce incentives.

Among the opportunities for tax savings available through the state are the Angel Investor, Downtown Development District, Low-income Housing, Historical, Opportunity Zone and Research & Development tax credits. All can be accessed and "stacked" by business owners looking to maximize their savings.


MYUNGHEE GEERTS

The combination of being a startup and settling in a distressed area the state is trying to revitalize affords entrepreneurs the opportunity to limit — or completely erase — their tax burdens.

"Owners can maximize the credits they receive and take advantage of what Delaware has been doing," Geerts says. "By investing money in certain areas for specific projects, business owners can get many credits and incentives."

"We want to help grow small businesses," DeStefano says. "We also want to remain competitive in terms of receiving investments from firms across the country and the world."

EDGE Grants provide cash infusion

Although it's important for fledgling ventures to get the kind of expert advice and counsel necessary to take the right steps at the outsets of their journeys, perhaps the most important ingredient early on is financing.

One of the more important developments on that front is the state's EDGE Grant program, which was started in May 2019 and provides up to $100,000 to STEM companies and $50,000 for non-STEM concerns. The competitive selection process rewards up to 10 firms each round and is open to ventures that are majority-located in Delaware, have been running for fewer than five years and employ fewer than 10 people.

"The goal is to get grant funding in the hands of early-stage companies," DeStefano says. "It's designed to create a competitive process and maximize the use of the money the state has to spend."

The EDGE program aims to reward those companies with the best plans, ideas and products, but special consideration is given to those businesses operating in one of the state's 25 Opportunity Zones. The program is designed to help with things like website design, rent support for laboratories, and building infrastructure and cosmetic improvements.

DeStefano reports the EDGE Grants have been funded by the state government for FY 2021 and hopes they will become "permanent" moving forward. By creating a thriving class of small companies, the state can spawn greater interest in its economy from the outside, as well as helping the employment picture in the state.

Those grants can be combined with the almost 100 different organizations and government entities the state has assembled to serve as resources for businesses looking to navigate the regulatory and licensing climates to give startups quite a bit of support.

"EDGE Grants definitely try to create jobs and target specific industries that the state has identified as key," says Myunghee Geerts, a principal at the Wilmington-based Cover & Rossiter CPA firm. "Delaware is investing in these industries so that their outcomes are better."

Tax credits and other funding options

Geerts' specialty is in identifying tax incentives and credits for clients. Two that she considers specifically helpful for business owners trying to gain funding are the Angel Investor Tax Credit and the Research & Development Tax Credit. High-tech companies looking to connect with sources of capital can pitch "angels" on refundable credits that permit them to gain a stake in the company's longer-term success while also allowing the angels to reap tax benefits in the short run.

According to Geerts, the R&D credit benefits young companies with less than $20 million in gross receipts. Delaware provides a cash refund of 100% of the federal government credit amount. "That can be a sizeable amount," Geerts says.

The Delaware Technical Innovation Program offers funding for companies that have completed Phase I of their development and have applied for Phase II of federal Small Business Innovation Research or Small Business Technology Programs as they work to bring products to market.

Firms that locate in "environmentally stressed sites," as determined by the state Council on Development Finance, can receive grants from the Brownfield Assistance Program. And companies choosing to settle in one of the state's 25 Opportunity Zones will receive tax credits and other incentives to assist their early efforts.

According to Geerts, small business owners can apply for and receive as many of these benefits as they can qualify for. The state is extremely willing to let them "stack" the credits to minimize tax liability and maximize available resources to promote growth. *(For more on stacking, see the sidebar on the previous page.)*

"What Delaware has done well is identify what the strongest industries are in the state," she says. "That includes tech and fintech. The state programs are good at focusing on and offering tax incentives and credits to create opportunities for economic development. That's really creating results."

COUNTIES AND MUNICIPALITIES OFFER EVEN MORE INCENTIVES

In addition to federal and state benefits, companies located in Delaware can take advantage of a sizable list of county and local incentives. Here are a few examples:

EXCITESUSSEX FUND: This public-private partnership between the Sussex County Economic Development Office, Discover Bank and The National Development Council offers longer-term loans and below-market interest rates to entrepreneurs.

DOWNTOWN DEVELOPMENT DISTRICTS: Sussex and Kent counties partner with this state-level program to offer rebates for construction and rehabilitation costs. County funds match state funds at 50 percent, meaning for every dollar in state funds companies receive through the program, they will get an additional 50 cents in county funds.

KENT COUNTY STRATEGIC FUND: Through this fund, companies can receive loans or grants for working capital, renovation, construction, equipment purchase, relocation expenses and more.

NEW CASTLE COUNTY PARTIAL PROPERTY TAX EXEMPTION: Businesses that invest at least $50,000 in new construction of commercial facilities in unincorporated areas are eligible for a three-year partial exemption from county property taxes.

For a complete list of county and local incentives in New Castle County, go to: www.nccde.org/776/business-assistance. For Sussex County, go to www.excitesussex.com/exceed/incentives. For Kent County, go to www.choosecentraldelaware.com/ourservices/incentives-choose-central-delaware.

THE RIGHT INVESTOR FOR THE NEXT BIG IDEA

Delaware's landscape of private funders keeps growing

BY MICHAEL BRADLEY

For those hoping to start and grow businesses in Delaware, there are plenty of opportunities to find the funding necessary to succeed. The state is known for its friendly atmosphere for commercial endeavors, and many avenues exist for those who need the capital to turn a great idea into a prosperous concern.


VINCENT DIFELICE

"There are folks that have problems that the market isn't solving," says **VINCENT DIFELICE**, the senior instructor of entrepreneurship and faculty director of venture support at the University of Delaware. "When you can tell someone, 'I know you have a problem, and I am working on solving it,' that person becomes an ally. You are getting their insight on the market." DiFelice calls those allies "early evangelists" because they will serve to promote a fledgling business to the outside world, including potential investors. Delaware's small size and close-knit entrepreneurial community makes it particularly easy to find those kinds of allies.

Once an idea is proven to be strong and necessary, the innovator behind it can seek the money necessary to thrive. Throughout Delaware, there are several potential avenues for new businesses to take in order to raise capital.

The Delaware Innovation Space sponsors the First Fund investment program, which offers startups a combination of cash and access to laboratory space to help them gather momentum. President and CEO Bill Provine reports the fund was created to "fill a void in the funding landscape" and to give entrepreneurs with great ideas "fuel" to keep moving forward. *(For more information, see Q&A on the next page .)*

Another important piece of Delaware's funding scene is Leading Edge Ventures, an early-stage venture fund formed in 2015 by First State Innovation (FSI). General partners in the fund include Tangen Biosciences CEO Rick Birkmeyer and LabWare founder Vance Kershner, along with Mike Bowman, Jeff Davison and Doug Petillo.

Over the past five years, the fund has invested in 15 early-stage companies. FSI also connects entrepreneurs with funding through its FSI Angel Network of affluent local investors.

Q&A

DR. BILL PROVINE
Delaware Innovation Space

Dr. Bill Provine is president and CEO of the Delaware Innovation Space, which aims to help tech entrepreneurs gain access to equipment and lab space, connect with experts and interact with scientists to help their startups grow and thrive. He discussed the Innovation Space's First Fund investment program, which began in early 2019 and is designed to help new companies gain momentum.

BILL PROVINE

JOE DEL TUFO/MOONLOOP PHOTOGRAPHY

Q: How did the First Fund come into existence?

It was a kind of evolution. In late 2017, the Innovation Space started. We wanted to help people bring new science companies to life and get them to a place where they can live on their own. We brought together equipment and technology, along with ways to match people with investors. What we found is that science startups have a lot of risk early on. The First Fund is a bridge between concept and getting to angel investors and federal programs. It can provide $150,000, half in cash and half in access to labs and innovation space. It can help get people off the ground.

Q: What is the main benefit of the First Fund?

We allow people to show that their ideas are working. That way, they can get investors interested and can say to them, "Why don't you come aboard?"

Q: How does one qualify?

An entrepreneur can connect with the fund if he has proof of concept and looks capable of getting to the next step. The application process and due diligence leads to a judgement call. It's not unlike the screening process for people who take up residence at our facility.

Q: Why is the access to technology and collaboration not enough?

We found that entrepreneurs have to eat. We went to our board and said that we needed to add a cash component to our other services.

Q: How many people can qualify?

Right now, there is no firm limit. We started with a few, and we hope we can continue to grow the number. I would like to have the problem of too many qualified applicants. There is a residency requirement. If we were just handing out dollars to startup companies, we would have a line out the door. We want them to land in Delaware.

Q: Is Delaware producing good ideas?

Over the past few years, we have seen a substantial increase in the quality and quantity of startups in the area. People are also coming from out of state to be here. We are trying to fuel our value proposition and keep making connections to the broader Delaware ecosystem.

Learn more about the First Fund program and start your application at www.deinnovates.org/first-fund-program.

Regional collaborations add to options


ARIEL GRUSWITZ

At the Delaware Prosperity Partnership (DPP), those with new business concepts can connect with a network of investors — private and state-run — with the ability to help them move forward. According to **ARIEL GRUSWITZ**, director of innovation at DPP, there are many options available. "We are mapping the ecosystem for funding," Gruswitz says. "Things have changed in the last couple years, and there are new resources. I think things have started to come together and that 2020 will be a big year for that. We want to get everyone around the table and to get alignment on each organization's core competency and focus."

The DPP is increasing its work with angel investors and venture capital funds. One example is the Mid-Atlantic Diamond Ventures Group, which is based in Philadelphia, but which held one of its 2019 quarterly meetings in Delaware. Since 2003, it has assisted more than 400 emerging firms by introducing them to a network of investors capable of providing capital.

Another avenue available to emerging companies is the annual Angel Investor Fair, held each year in Philadelphia, which brings together as many as 300 investors from the Mid-Atlantic region to hear pitches from a collection of hopefuls culled from a variety of applicants across nearly 20 industries. Over the past several years, the angel community has not only grown, but it has started to work more closely together to identify targets for investment.

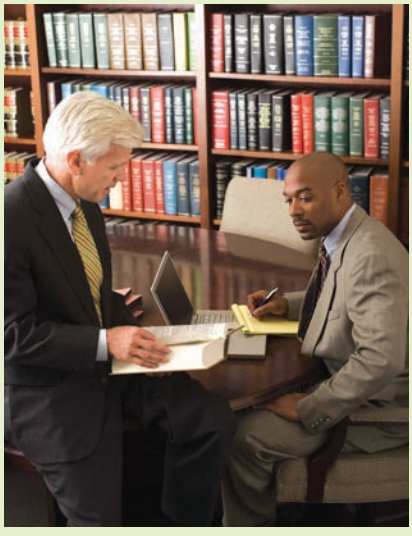
"These groups have popped up over the years and have become somewhat structured," says DiFelice. "[Investors] get together and talk about deals they have seen, and it's up to the entrepreneur to connect with them and try to show them they have something that is investable."


INTELLECTUAL PROPERTY
COPYRIGHT
PATENTS
INVENTION
TRADEMARK

PROTECTING INNOVATORS

BY MATT WARD

Delaware's Court of Chancery and Superior Court excel at safeguarding intellectual property



When you need heart surgery, you don't go to the family doctor — you go to the most experienced surgeon you can find. That's the best way to describe how Delaware's court system fits into the national landscape, says Gene Quinn, president and CEO of IPWatchdog. For matters of corporate law, and specifically for cases dealing with intellectual property, the First State is your go-to surgeon.

In Delaware, he says, "you're going to a court where they know what they're doing, they do it all the time, and they get it right." That advantage goes hand in hand with the state's long-held reputation for being a good place to do business.

"Delaware just has a very good business climate," says Quinn, himself a patent attorney and a leading commentator on patent law and innovation policy. "That's very important for startups — it's far more important for startups than people realize, I think."

Intellectual property (IP) generally fits into four categories: patents,


ARTHUR G. (CHIP) CONNOLLY

trademarks, copyright and trade secrets. Patents fall under federal law and have to be obtained through the U.S. Patent and Trademark Office; once a patent is issued, the owner gets a 20-year monopoly on the property covered by the patent. The downside is that, in order to get the patent, the owner has to divulge a lot of specifics, potentially opening the door to copycats and knockoffs.

Trademarks (for brand names) and copyright (for literary work, music, photographs, drawings, etc.) can be claimed under common law and can also be registered with the federal government. Trade secrets generally apply to the same sort of information as patents — except, rather than share the information publicly, the owner chooses to keep the recipe for the secret sauce, as it were, under wraps.

Trade secrets sometimes end up in court as a result of mergers and acquisitions, says **ARTHUR G. (CHIP) CONNOLLY**, founding partner of Connolly Gallagher LLP in Wilmington. Connolly's career has been mainly in corporate, commercial and patent litigation in state and federal courts in Delaware. Often, during a prospective acquisition, the purchasing company will want to see the details of some protected software code at the company being considered for purchase. It sometimes happens that, after having a peek at the code, the purchasing company pulls out of the deal and tries to come out with a similar product. Or, it may happen that an employee at a tech firm strikes out on her own, and the company she left wants to make sure she doesn't divulge or deploy its trade secrets.

That is where the Delaware Court of Chancery comes in. Companies or individuals seeking to protect intellectual property can get an expedited injunction there — basically a restraining order against use of the trade secret — that lasts 14 days; then, the court can (and often does) issue a preliminary injunction, essentially an extension of the original restraining order, to protect the trade secret through trial.

"You can move very quickly, and get very prompt relief," Connolly says.

'We have the best trial courts in the country'

While the Chancery Court can provide injunctive relief, Delaware's Superior Court is the venue for jury trials on IP issues. It, too, has a strong reputation for protecting innovators. "We're really lucky in Delaware, in that we have the best trial courts in the country," Connolly notes.

Quinn points out that cases tried and decided in Delaware courts tend to hold up well to scrutiny. "The district court in Delaware is very, very sophisticated," he explains. "If you have a litigation in Delaware, and then that were to get appealed, nine times out of 10, those judges are not reversed — and that's extraordinary because the federal circuit reverses everybody. The judges in Delaware — and this is well recognized and well understood — are a different breed, and it's probably because they almost have to be. They see so many corporate matters with complex litigation that they have a lot of processes in place; they know what they're doing. It's not to say that other judges don't know what they're doing, but when you have a plethora of other kinds of cases [such as drug cases and criminal cases], you don't necessarily get really good at complex civil litigation."

It's that experience, and the legal framework that supports it, that sets Delaware apart as a good place to start and grow a business. "If you have the opportunity to choose where to locate, and you can locate in a jurisdiction that has favorable business rules, it's really a no-brainer," says Quinn. "The benefits of being incorporated in Delaware are hard to match."

CULTURE IS CRUCIAL

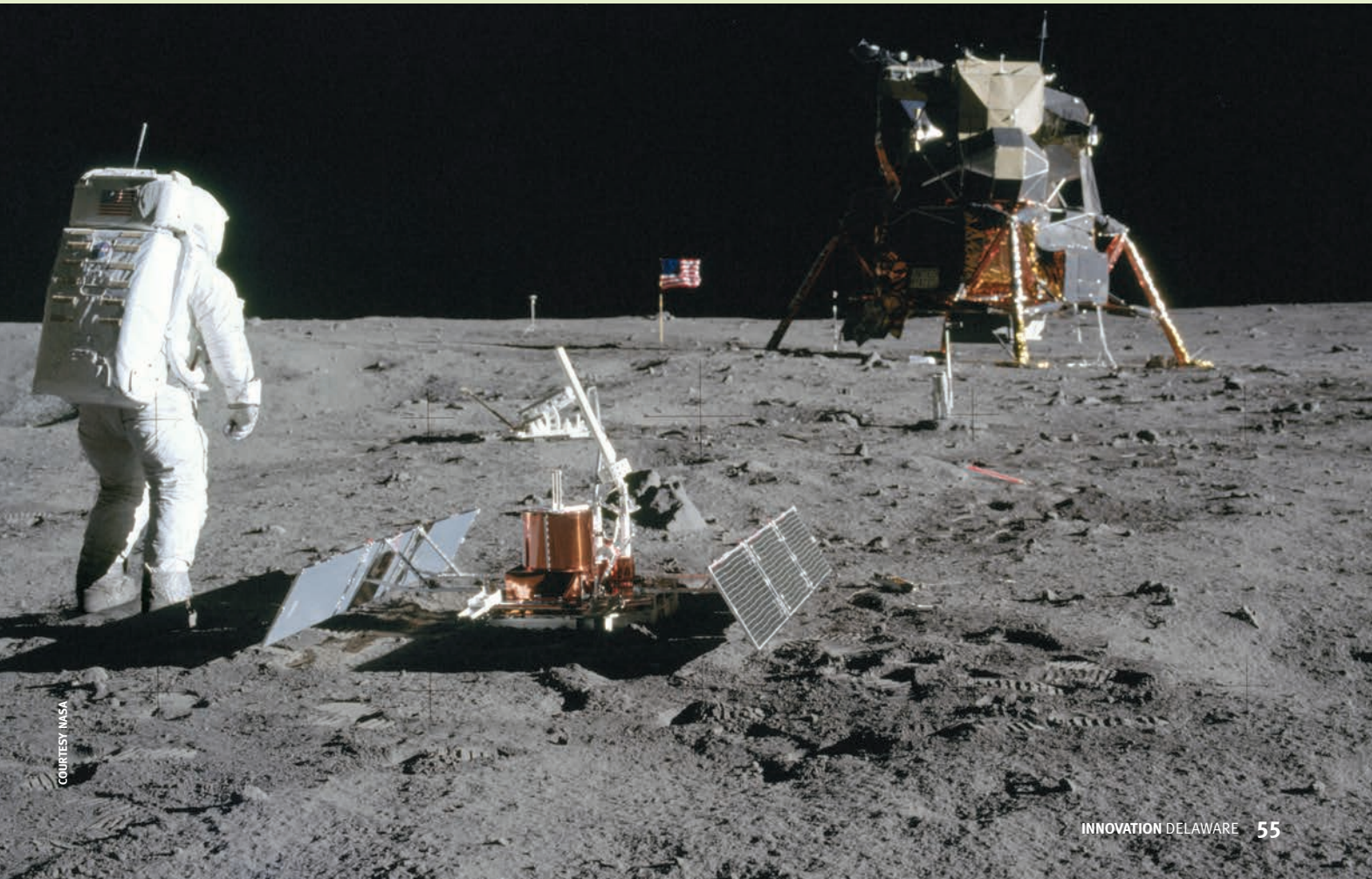
Business leaders share how their company culture drives innovation

ILC DOVER

BY FRAN DINUZZO

All that transpires at ILC Dover stems from innovation — the true heart of what we do. We've designed and engineered products that solve our customers' complex problems since 1947. But successful innovation requires more than a great idea, flawless design and precise engineering. It also involves a culture of innovative leadership.

According to business consulting firm Accenture, "Innovation can be a company's most powerful tool and a key driver of value. Yet many executives, fearful of the risks inherent in pursuing edgy new ideas that may not succeed, hesitate to unleash its full potential. They prefer, indeed, to renovate rather than to innovate."



COURTESY NASA

Failing to innovate is risky business

If a business shies away from innovation and managing the risk that comes with it, that business will struggle to hold a leadership position in its industry. Continuous and creative innovation is essential for a growing and profitable enterprise.

For a business to have success, and for a senior leader to have success, it's essential they surround themselves with great people. Leadership development is how these people continue to expand their capabilities. Individuals with the greatest potential to be innovative leaders should possess many of these qualities:

- Phenomenal integrity.
- Selflessness — not looking for what they will get out of a project, but for what they will be able to do collectively with their team.
- Guts. I've never met a truly good leader who wasn't willing to try things that they weren't sure they could accomplish. They push the envelope and encourage their team to do the same.
- Patient persistence. Innovation can be risky, and not everyone has the same risk tolerance as the leader. It is critical to lead persistently (applying constant pressure) while also being patient, allowing the team to stay synchronized on the effort. This balance is one of the most critical aspects of leading innovation and change.
- Being a great communicator.

Wasted potential

Potential must be nurtured. Because everyone learns differently, you have to understand what motivates them. How do they learn best — through coaching and training, or through experience?

I like to give potential leadership candidates challenges like a management role in a project, program or event. It's an opportunity for them to learn how to lead by compelling their team to achieve rather than just leading by authority alone. It helps them discover what they are truly capable of, build self-confidence and push the boundaries of what they can accomplish. It forces them to be innovative.

FRAN DINUZZO

Unexpected innovators

A successful organization has innovative leaders at all levels and you should know who they are — particularly critical when you're trying to do change management. Not everyone that's a supervisor is a leader, and not everyone that's a leader is a supervisor.

There are people at all levels whom others watch to see how they will react to organizational changes and increased goals and objectives. And if you can engage them in the change process, they become

DUPONT

BY THERESA WESTON AND MELISSA J. HELPINSTILL

At DuPont, we believe finding innovative solutions to problems begins with speaking to the people dealing with those problems in the first place. Today, we are using technology and machine learning to crowdsource our ideas from the experts.

Regardless of the methods, one thing that hasn't changed is our focus on thought diversity, pulling people with different expertise and backgrounds together to find the most effective solutions for our customers. As women in construction, we have each been the only woman in a room at one point in our careers. In order to truly foster innovation, leaders must cultivate greater diversity and inclusion to reap the benefits of true diversity of thought.

Before product development begins, experts and teams must first understand the problem they are trying to solve. Through a method known today as ethnography, DuPont scientists and engineers head into the construction zone to study their subjects at work.

One of our most successful experiences with this process occurred 20 years ago, when builders reported struggling with water and air intrusion at window and door openings. Tasked with finding a solution, Theresa and her team traveled to job sites across the country, observing deficiencies in existing window installation practices and conducting in-depth conversations about their concerns.

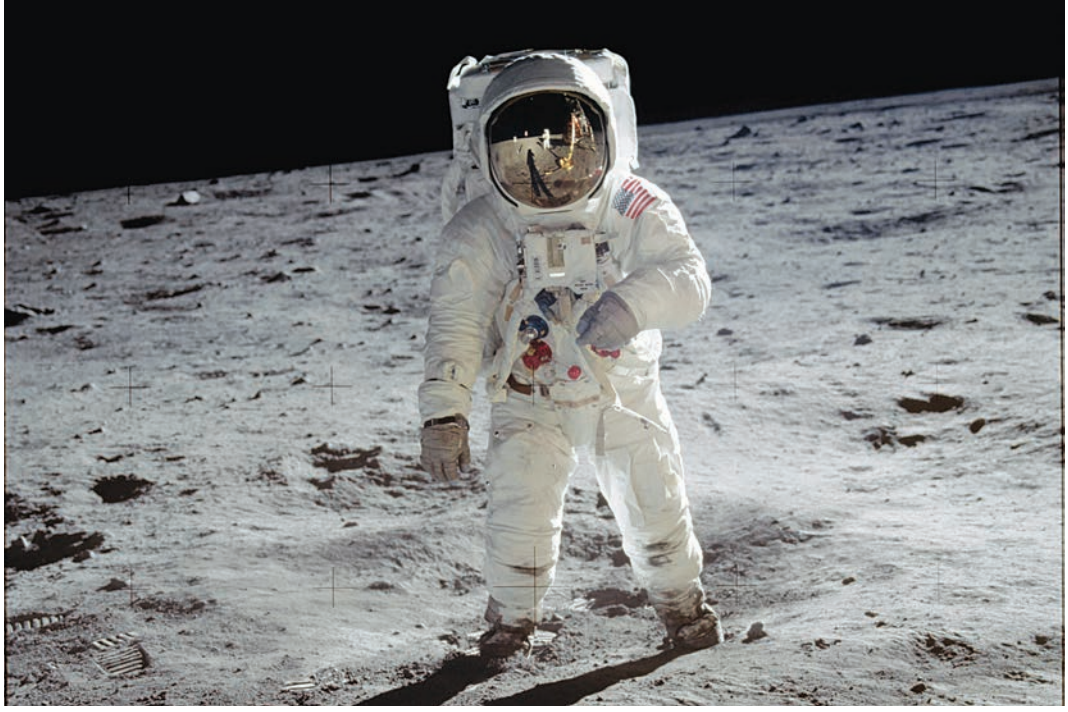
When they returned, an intellectually diverse DuPont team got to work on fixing the problem, often leading to debate. While different perspectives can delay finding a solution, the result is often finding a better one. Theresa and her team ultimately identified the installation issues that inspired the development of DuPont FlexWrap and DuPont's future flashing product line.

Decades later, ethnography is still essential to understanding both business and user needs. But as society advances, our problems become more complicated to solve, requiring an even greater pool of diverse thought to find innovative ideas.

That's why DuPont is building on its strong heritage of research and innovation with technology designed for teamwork. Complementing ethnography's external problem-identification process, the company is now turning to its international internal network for solutions.

In August 2019, DuPont introduced the Construction Productivity Challenge, a crowdsourcing effort to address obstacles in construction. The program recruited about 5,000 DuPont employees around the globe who specialize in construction to gain insights from the people who know the subject best.

With over 100 submissions, ideas were narrowed down to the top 10 concepts. Three winners will be announced based on how these ideas can be integrated into existing strategies for core innovation or for new adjacent



an incredible resource in the company to help others understand that "the place we're going to" is worth the risk.

'Aim low, boring — aim high, soaring'

An innovative leader is essential to seeing opportunities not only across the organization, but well beyond. They give their teams objectives that stretch them out of their comfort zone and keep them learning and growing; and keep them stronger, more creative and more effective. When it comes to growing a culture of innovative leaders, don't lower expectations to meet performance. Raise the level of performance to meet expectations.

FRAN DINUZZO *is CEO of ILC Dover, which is recognized globally for its flexible containment solutions, including the spacesuits that went to the moon in 1969. ILC Dover was recently acquired by New Mountain Capital.*

THERESA WESTON

MELISSA J. HELPINSTILL

growth. The Construction Productivity Challenge technology has provided a digital framework for sharing and collaborating on solutions. Overall, the program allowed DuPont to scale thought diversity to the worldwide team, bringing the company one step closer to the next big idea in construction.

With DuPont's goal of full gender parity by 2030, we are no longer the only women in the room and are now leading a thriving network of female professionals, scientists and engineers — Theresa as a DuPont Fellow, the highest technical professional level in the company, and Melissa as a co-leader of DuPont's Global Women's Network, the company's largest employee resource group.

With businesses' increased desire for creative solutions, it is important now more than ever that women take advantage of today's opportunity and assert themselves as a valuable piece of the innovation puzzle. Women should be willing to speak up and be confident in what they have to say and share ideas without worry of what others will think. Finding a male ally can be valuable. Better yet, find fellow females and create a community of change.

THERESA WESTON, *PhD, began her career at DuPont at the Experimental Station and now leads building science and construction technology research for DuPont Performance Building Solutions. She is one of only 13 DuPont Fellows.*

MELISSA J. HELPINSTILL *has worked for DuPont for 20 years and is currently the Global Strategy & Growth Leader, Performance Building Solutions and Corian Design. She is also the co-leader of the Global DuPont Women's Network, the largest diversity network in DuPont, which focuses on engaging, equipping and empowering women for individual and corporate success. Melissa lives in Middletown.*

GIVING THEM WISDOM

BY CHRISTI MILLIGAN

How Delaware's culture of connections and mentoring shaped these innovators

The right mentor can distill years of business know-how into lessons on marketing, strategic partnerships, or even a blueprint to pivot a business for maximum success. Given Delaware's tightknit entrepreneurial community, finding that mentor is arguably easier in the First State than just about anywhere else.

Meet three Delaware mentors — and their mentees — who apply various approaches to help the next generation of entrepreneurs and innovators chart their course.

Mike Bowman ⟼ Ken James

As State Director of the Delaware Small Business Development Center, **MIKE BOWMAN** is no stranger to advising startups. And with his office in the Delaware Technology Park, location proved a boon to lending "neighborly advice" to **KEN JAMES**, owner of Supercritical Fluid Technologies Inc., housed on the same campus.

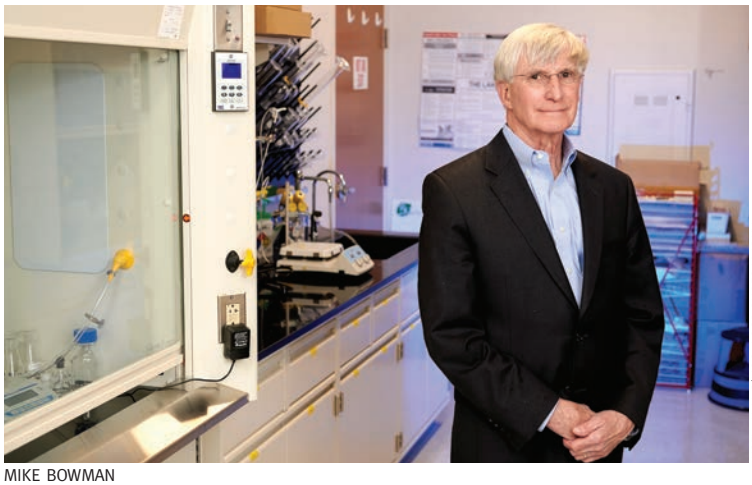
According to James, Bowman's advice was reassuring as his business evolved. "I am a scientist," he says. "A lot of entrepreneurs think they know everything, but you want to surround yourself with those who cover your weaknesses. I've always found that with Mike."

Bowman said one of his goals was to help James — whose product separates fluids using carbon dioxide — keep his budget and growth parallel.

Early on, Bowman encouraged James to build a website with tracking features, and he helped him identify the right strategic partners. "It's making the best of your business by thinking things through in a way you haven't," offers Bowman, on his mentoring approach. "It's a reflective thing."

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

LINDA FARQUHAR



MIKE BOWMAN

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

KEN JAMES

"Once you have folks you trust, pay attention," says James, whose company has experienced 10 to 15 percent growth each year, with millions in sales and exports worldwide. But as a scientist, James turned to people like Bowman for some business basics. "He guided me on how to write instructions for Confirmed Irrevocable Letters of Credit, a banking tool," says James. "I sell $100,000 pieces of equipment and it could sink the company if [customers] don't pay me. It's a common thing in business, but I'd never heard of it." But Bowman knew, and told James how to get it done. He also helped James identify whether an unusual opportunity was the real deal.

"Early on in our company's history, Russian scientists came to me and wanted to purchase equipment, but they had no hard currency," explains James. "But they offered things to trade." James says he went to Bowman for advice, who confirmed the offer — and the option — was viable.

"Mike's advice has always been golden nuggets in the wash of everything that goes on," James says.

"It gives me self-worth to do what I do," says Bowman. "It's implied credit, the joy of transferring what you know to someone else and they can grow...that's what makes you get up in the morning."

Joshua Martin III ↦ Dan Young ↦ Jordan Gonzalez

Just like parenting, one sure sign that you've done right by your mentee is watching how they lean into the next generation. For veteran Delaware business leader **JOSHUA MARTIN III**, the fruit of his time with mentee **DAN YOUNG** is seen in Young's influence in the life of **JORDAN GONZALEZ**.

"It's hard to remember a time when they weren't around," says Young, of Martin and his wife, Cynthia. "As a couple they've had a profound impact on my success."

That Martin made time for Young speaks volumes of this powerhouse business patriarch. A former president and CEO at Verizon, Delaware Superior Court Judge, and now senior counsel at Potter Anderson & Corroon, Martin has a robust resume and decades of experience in the legal realm, navigating boardrooms and successfully changing careers. His advice to Young, a rising financial professional turned academic, was powerful, but less focused on strategy and more on countenance and courage, according to Young.

"Whenever I have a question, like making a move from being a financial advisor to academics, he's always available to meet for coffee, and he talks about how to manage people, and how to manage people's expectations," explains Young, director of the Doctor of Business Administration program at Goldey-Beacom College and the curator of TEDxGoldeyBeacomCollege. "His thoughts on how to manage my own identity as a young man of color and how to carry myself, or just the way he had time for me, made it clear that I always have someone in my corner."

"We just had very flowing conversations over an extended time," says Martin, who describes his mentoring style as one of semi-structured guidance. "Basically, I used the opportunity to give him some things to think about as he was preparing for his career."

Young says the conversations created a framework for the kind of man, boss, friend and mentor he is. "That focus on work ethic, on integrity, doing the right thing and giving back — that was always present and it's incredibly unique about him. He's able to walk with just regular rank-and-file people and then meet with CEOs and heads of state and be highly respected."

Five years ago, Young had the chance to become a mentor in his own right. As an adjunct professor at the University of Delaware, where he taught a class on entrepreneurship, he met Jordan Gonzalez at the Horn Entrepreneurship's Venture Development Center.

"He was friendly and enthusiastic," says Young of Gonzalez, a finance major who was working on an engineering study website aimed at fellow students. As the only black professor in entrepreneurship, Young says it was natural to befriend

JOSHUA MARTIN III

JIM COARSE/MOONLOOP PHOTOGRAPHY

DAN YOUNG

JORDAN GONZALEZ

Gonzalez and learn about his interests. "There are not a lot of African American students in entrepreneurship," he says.

"Jordan always wanted to learn what it took to be successful, but he was far more tech-focused than I was," says Young. "I tried to give him advice about target marketing and customer discovery. We started talking in generalities. I think that as Jordan went from freshman to senior, he would ask more and more questions and ask more advice."

The website wasn't Gonzalez's only hat in the innovation ring. By his senior year, he and two other students had created GeoSwap, the app that helps brands get a digital presence at events. With the promise of scalability, development and marketing of the app soon dominated his meetings with Young.

"We talked about what a good team looks like in terms of the folks you're working with, as well as creative ways to market," remembers Young. "He was one of those students that whatever was on his mind, he would ask if I had dealt with it."

One challenge they tackled together? How to identify the right target market for GeoSwap. Young told Gonzalez his team should pay attention to where students gathered.

"It was in relation to testing the first iterations of our product and getting it in front of people," says Gonzalez. "It was the best way to access a lot of people and make big steps forward quicker. Some of our first groups we went to were registered student organizations at UD. It was a great way to get a lot of opinions in one go."

What he valued about Young, Gonzalez says, "is he really treated me like an equal. While I knew he had more experience and valid information, it always seemed like a friendship." Gonzalez sold GeoSwap a few years ago and is now a co-founder of Greenville Studios, a consumer commerce startup.

But he still keeps in touch with Young, and even participated as a TEDx presenter.

For Young, mentoring Gonzalez was just an extension of the things he'd been taught by Joshua Martin. "Entrepreneurship runs counter to higher education. It's key that you fail over and over, and most of the impact we make on these students is outside the classroom, giving them wisdom."

Ellyn Herbert ↦ Linda Farquhar

LINDA FARQUHAR, founder of entre-Donovan custom fashions, had already been through the first cohort of WeTHINK, the program founded by **ELLYN HERBERT** and Antara Dutta that gives women-owned businesses tools for business growth and leadership development. Herbert is an economic development specialist at the Delaware District Office of the U.S. Small Business Administration.

Farquhar started her company more than eight years ago with the goal of transforming women's apparel through custom fittings. Her trump card? Scanner technology that features 3-D simulation. "I wanted to incorporate technology into this business that I would build," explains Farquhar, a former stock analyst. So as she hammered out her business plan, she reached out to the Small Business Administration for help — and found herself in the freshman WeTHINK class, an initiative piloted by the Small Business Administration's Delaware District and SCORE Delaware.

ELLYN HERBERT

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

LINDA FARQUHAR

The 12-month program was much more in-depth than Farquhar imagined, but it also proved to be the genesis for an ongoing friendship with Herbert and Dutta. "It helped me accumulate knowledge so that when an opportunity or challenge presented itself, I was better equipped to take action."

When WeTHINK relaunched as THINKMainStreet in 2017 with an emphasis on helping businesses "modernize, digitize and supersize for growth," Farquhar was invited back. She says the timing was perfect. She had closed her brick-and-mortar store in downtown Wilmington and was looking to target her technology to retailers.

"[THINKMainStreet] really had a program put together where we would try and look at our whole business and determine the 'x' factor," says Farquhar. "I wanted to build a company that was scalable so that women across the world would have clothing that would fit well. The boutique was a good laboratory for learning...but I really thought we needed to be in markets with bigger concentrations of professional women."

Herbert says she and Dutta agreed.

"We had to identify high-end boutiques and establish conversations with them," says Herbert, who adds that this discovery process is crucial with each participant. "We wanted to understand how she could make a splash in the industry, and we had to focus on customer experience."

For Farquhar, that meant both the retailer and the end-user, or customer, with no friction points in the transaction, and she relied on the extensive research provided by Dutta, an expert in strategy and innovation, and Herbert, who boasts broad experience in sales and marketing.

With entreDonovan now a wholesale enterprise, Farquhar works out of a warehouse in Marshallton, and continues to market her technology to interested retailers. She admits it's not easy, but she has some knowledgeable people — and good friends — at her disposal.

"There are always roadblocks or things you'd never predict and you just need someone to talk things through; and I can just call Ellyn or text and ask her questions and I can talk through something and she gives me some insights," she says. "The relationship with Ellyn and Antara has been longer and richer than I expected, but it's helped to develop a whole ecosystem around me."

INNOVATION BY SECTOR

Long gone are the days when Delaware was known for chickens, credit cards and chemicals. Today, the First State's economy is a bustling hub of innovation in sectors as diverse as bioscience, fintech and health care.

Manufacturing has always been a major driver of Delaware's economy. Well-known players like ILC Dover still have a large presence in the state and continue to innovate, as you'll see on *page 66.* Those giants are joined by innovative newcomers like SAS Nanotechnologies, which is working on a more sustainable way to solve arguably one of the industrial world's most vexing problems: corrosion.

Delaware's major poultry producers have been working on a number of ways to make poultry farming

more sustainable, effective and humane. Read about Perdue Farms' process innovations on *page 70*. Younger Delaware companies, such as 302 Aquaponics and Napigen, are focused on reducing agriculture's carbon footprint and using plant genetics to solve the challenge of feeding a growing world population, respectively.

In the bioscience sector, Delaware's landscape is particularly diverse. It's composed of instrument manufacturers like Agilent and Siemens, consumables manufacturers like ACROBiosystems, contract research organizations like QPS, and biomedical researchers like Incyte. Read more about QPS' work on *page 74*. You'll also learn about how Delaware companies are using lasers to disrupt the pharmaceutical space and using innovative testing methods to reduce contaminants in food.

Delaware's chemistry sector was traditionally dominated by DuPont and, later, some of its spinoffs, including W.L. Gore & Associates. Gore's most significant discovery, a compound called ePTFE, continues to spawn new innovations today, as you'll read on *page 76*. At the same time, more recent additions to the chemistry space, like White Dog Labs and W7energy, demonstrate how chemical know-how can be used to solve some of the world's most vexing challenges, such as replacing high-carbon energy sources with greener alternatives.

Another traditionally strong sector in Delaware is financial services, which has evolved in recent years to include not just major banks but also up-and-coming fintech startups. One prime example is FundingFuel, which allows consumers to easily make investments in franchise portfolios. Read more about FundingFuel, and about how banking giant JPMorgan Chase is investing in fintech in Delaware, on *page 82*.

In health care, major health systems such as ChristianaCare and Bayhealth are at the cutting edge of clinical research and tech-based patient care. Their work is enhanced and supported by visionary startups like Resonate Forward, whose innovations are making life easier for those suffering from Parkinson's disease. Turn to *page 84* for their stories.

DELAWARE TECH

DEMEP

Delaware Manufacturing Extension Partnership

Growing, Connecting, and Building Delaware's Manufacturing Ecosystem

The Delaware Manufacturing Extension Partnership (DEMEP) is one of the state's "hidden" treasures. The 501(c)3 non-profit was created by Delaware manufacturers and the Delaware Economic Development Office (now Delaware Division of Small Business) in 1993 to help Delaware manufacturers stay competitive in a global economy.

DEMEP is the official representative of the MEP National Network™ in Delaware. The MEP National Network is comprised of the National Institute of Standards and Technology's Manufacturing Extension Partnership (NIST MEP) and 51 MEP Centers located in all 50 states and Puerto Rico. Some Centers are run through partner organizations, while others are independent. DEMEP functions on behalf of Delaware Technical Community College, and is based at the College's Stanton Campus.

So what does this all mean to the small- and medium-sized manufacturers in the State of Delaware? It means that they can look to DEMEP as a trusted business advisor that can help companies create (Lean) continuous improvement cultures, implement quality management systems, access new technologies and grow new markets. As part of the MEP National Network, DEMEP agents have access to the experience and knowledge of more than 1,300 fellow experts across the country and local resource partners to help companies find new ways to accomplish their goals.

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DEMEP OFFERINGS

The below list is a sample of some of DEMEP's most popular service offerings. However, DEMEP is able to bring together resources to provide any type of training that a manufacturer may need.

- Principles of Lean Manufacturing with Live Simulation
- Value Stream Mapping
- 5S Workplace Organization and Standardization (Creating a Visual Workplace)
- Set-up Reduction/Quick Changeover
- Total Productive Maintenance (TPM)
- Performance Measurement for Lean Enterprise
- Leadership for Value Stream Management
- Poka-Yoke (Mistake Proofing)
- Tools and Techniques for Problem Solving
- Team Building for a Lean Culture
- Standardized Work
- Cellular/Flow Manufacturing
- Lean Office & Administration: Value Stream Mapping for Non-Production Processes (Office Value Stream Mapping)
- Pull/Kanban
- Practical Statistics Tools
- Design of Experiments
- Essential Leadership Skills for a World Class Enterprise
- ISO9001 Overview of the Standard
- ISO9001 Internal Auditing – A Process Approach
- Transitioning to ISO9000:2015
- Six Sigma Greenbelt and Blackbelt
- Strategic Planning
- First Line Supervisory Training
- Health & Safety
- Health & Safety Training
- Lean Product Development: Reducing Time in New Product Development
- Lean Product Design: Reducing Cost in New Product Development
- 3P: Production, Process, Preparation
- Supply Chain Optimization
- Total Cost of Ownership
- A3 Report Writing
- ISO 14000
- ISO/ TS 16949 – 2002: The New Global Automotive QMS Standard
- Additional ISO Courses Available Upon Request
- Innovation Engineering Jump Start, for Small & Mid Sized Companies

ILC Dover: Safeguarding Subway Tunnels with a New Kind of Barrier

New York City has more than 245 miles of subway tunnels. Much of that underground area flooded in 2012 when Hurricane Sandy blew through.

ILC Dover is working to ensure that doesn't happen again.

While most people think of aerospace when they think of the Frederica-based company, that is only a small portion of what ILC does.

In addition to spacesuits and habitats for people to live in space, the ILC product lines include all manner of flexible protection, such as bulk packaging, personal safety and pharmaceutical manufacturing safety.

ILC is about solving complex problems for customers, says **DAN KLOPP**, product marketing generalist. And it was a complex problem in New York that launched the company's newest division, flood protection.

Representatives from the New York mayor's office approached ILC soon after the World Trade Center was attacked in 2001. Concerned about possible attacks to the tunnels leading into the city, they wanted some way to stop flooding in those tunnels if they were breached.

"They asked if we could make a blimp that can inflate in a tunnel," says Klopp. (Blimps are another part of the ILC product line, with the Goodyear blimp being the most famous.) So ILC created the "Resilient Tunnel Plug." But ultimately, the company realized a blimp wasn't a great solution for the city's problem. The blimp didn't achieve a tight seal and the fabric wouldn't bend enough to fill in around all the different structures inside the tunnel. Then there was the fact that inflating a giant balloon in a tunnel would probably break the tunnel.


DAN KLOPP

So ILC came up with a better solution that could be used in flood mitigation throughout the country. The traditional water barrier was rigid and usually involved steel posts that had to be brought in from offsite using heavy machinery. ILC's design is an innovative, flexible system — the Flex-Wall and Flex-Cover. It can be stored onsite, where it can drop from a ceiling, be stretched across a stairway, or be pulled across an opening in less than 10 minutes, says Klopp.

The flexible design allows floating debris to hit and bounce off the system. Plus, the Kevlar reinforcements are five to 10 times stronger than steel.

"It seems counterintuitive," says Klopp. "It's something you can fold."

The system is currently installed at more than 60 subway stops and is rated to withstand water as deep as 16 feet, says Klopp. The streets of New York, on the other hand, would cave in under 10 feet of water.

"It's incredibly high-tech, but looks low-tech," says Klopp.

The flood-mitigation solution also hearkens back to ILC's historic roots, Klopp points out. After all, ILC made the first inflatable life rafts that were used by the Navy during World War II.

ILC was recently acquired by New Mountain Capital. Under the new ownership, Klopp says, the company is looking forward to growing its innovative product lines even more.

—Kim Hoey

INNOVATION **BY THE NUMBERS**

MORE THAN
25,000
Number of Delawareans employed in manufacturing

$5 BILLION
Economic impact of Delaware's manufactured goods industry

5x Amount of times the Port of Wilmington's capacity for shipping will increase under a $600 million investment from port operator Gulftainer

MORE THAN
96%
Percentage of Delaware's global exports that stems from manufacturing

1,520
Number of manufacturing firms in Delaware

Source: Delaware Prosperity Partnership

SAS Nanotechnologies: Finding a Sustainable Way to Stop Metals from Corroding

Corrosion is one of the biggest problems in the industrial world.

The cost of replacing parts, protecting against and inspecting for corrosion costs companies and the country about $500 billion a year, according to the National Association of Corrosion Engineers and the G2MT Laboratories (a society of metallurgists).

Boats, bridges, anything made of metal will eventually corrode if it isn't coated. The coatings used to stop that corrosion often bring environmental and potential health problems of their own.

SAS Nanotechnologies in Newark has a solution. The company's product senses when a scratch happens in the anti-corrosion coating and automatically fixes it.

"It will stop the corrosion," says **SUMEDH SURWADE**, founder and CEO. "Once corrosion starts, the coating [kicks in]."

The key to the product is a smart polymer microcapsule, a tiny ball filled with a corrosion inhibitor, lubricant or other product. The microcapsule is activated by the electrochemical reaction of corrosion to release its payload.

"It's very simple chemistry," says Surwade, who holds a PhD in chemistry and polymer science from University of Massachusetts at Lowell.

Most anti-corrosion coatings today contain toxic metal ions such as chromates, zinc and lead. As corrosion spreads, it causes the coatings to flake and peel. Even the chemicals involved in repairing and repainting the structures are dangerous to our health, says Surwade.

Less corrosion means less flaking and peeling of toxic metal coatings and less need for repair and repainting. The corrosion inhibitors in the SAS platform are water-based and environmentally friendly.

"We hope we can make the environment better. That's the plan," he says. The SAS in the company's name stands for "smart, advanced and sustainable." The microcapsule replaces the need for several different toxic anti-corrosion materials, so it actually costs less to make the coating with the nanotechnology.

Although still very small, SAS has already received some big attention. Recently, the three-person company was awarded a "Paint the Future" collaboration award from Dutch coatings company AkzoNobel to create more organic corrosion inhibitors.

"We're very excited to continue our collaborative journey with the recipients of the Paint the Future awards," says **KLAAS KRUITHOF**, AkzoNobel's chief technology officer and chairman of the Paint the Future jury. "We're going to drive innovation in paints and coatings beyond expectation, imagination and generations."

The potential applications for the anti-corrosion products are huge, says Surwade. The technology could be used for everything from stopping corrosion on oil rigs in the ocean to protecting the undercarriage of personal automobiles driving on the beach. SAS' goal is a world with corrosion-free metal structures made with environmentally sustainable coatings. But stopping corrosion isn't the only possible use for the microcapsules. Other applications being explored include pesticide release, lubricant additive, adhesive additive, even food packaging and specialty chemicals. Surwade is open to collaboration with other companies.

> *"We hope we can make the environment better. That's the plan."*
>
> *—Sumedh Surwade*

SUMEDH SURWADE

"The company we want to build is the kind of company that works with customers to solve their problems," says Surwade. *—Kim Hoey*

302 Aquaponics: A More Sustainable Way to Farm

No pesticides, no fertilizer, no soil, 800 heads of lettuce a day and maybe a fish dinner or two — that is the plan for recently opened 302 Aquaponics in Dover.

The company, founded in February 2019, represents a growing sector of agribusiness, and its owner, **DOUG WOOD**, believes it's the future of agriculture.

Inside the 15,000-square-foot greenhouse, 12 blue 800-gallon tanks with windows in the side bubble away. "This is actually our nursery," he says.

In each tank, between 250 to 300 fish, tilapia, do what fish do — eat, swim and poop. It's the waste that gets Wood excited. That is what fuels the agriculture.

Water from the tanks is passed through biomechanical filters that break down the waste into nitrate. The nitrate-rich water is pumped into long, low tanks with floating rafts. Lettuce seedlings — romaine, spring mix, summer crisp and Waldmann's — are placed in holes in the rafts and draw the nitrate up through their roots. This process provides fertilizer for the plants while simultaneously cleaning the water.

The cleaned water is then pumped back to the fish tanks and the process starts again.

Solids filtered out of the water are pumped to a different tank filled with clay pellets, where heavier, slower-growing plants such as kale, broccoli, cauliflower and swiss chard are expected to be grown.

There is no need for pesticides since the greenhouse is an enclosed space. Other problems that have shown up in commercial lettuces — such as E. coli contamination — are not worries here.

"We're the only people handling [the produce], and fish don't carry E. coli," says Janelle Bowen, greenhouse manager at 302 Aquaponics.

The process is still labor intensive at this point, since Wood and Bowen are doing most of the planting and harvesting work to ensure quality control at the beginning. They hope to hire others as they continue to grow.


DOUG WOOD

The plan is to sell the produce to local schools and restaurants, with a small amount saved for retail sale.

302 Aquaponics does not have a license or facility to filet the fish, so the company hopes to sell those whole in the Philadelphia market. The fish come to the facility as guppies, weighing about 1 gram, and they are sold at 1 kilogram (about 3 pounds). 302 Aquaponics uses about a tenth of the water it would take to grow plants in the ground, has relatively low energy consumption and on average turns out a product faster than traditional farms would — in about 38 days. 302 Aquaponics' approach also eliminates the need to weed or till soil, there are no soil-borne diseases, and no pesticides or chemicals are used. Wood even feeds the fish non-GMO food. Finally, 302 Aquaponics has a smaller carbon footprint because the produce isn't being shipped across the country.

Wood, a former special education teacher, started out growing strawberries and lettuce hydroponically in a backyard greenhouse several years ago. He says it took the death of his mother to realize that life was short and he had to take a chance to do what he loved on a large scale.

"This was just a hobby. I don't want to be that dude in the end who says, 'I should have done that,'" says Wood. One of his goals, besides making the business work, is to slowly expand the product line. "I joke that I want a watermelon at Christmas next year." *—Kim Hoey*

INNOVATION BY THE NUMBERS

No. 2
Delaware's ranking among states on agricultural value sold per acre

42%
Percentage of Delaware's land used for agricultural production

$1 BILLION
Annual sales generated by Delaware's poultry industry

$10,000
Amount provided to Delaware farmers who want to install environmentally friendly irrigation systems through a new partnership between the Delaware Department of Agriculture and the Delaware Electric Cooperative.

MORE THAN 8,500
Number of jobs supported by the poultry industry in Delaware

Source: Delaware Prosperity Partnership

Napigen: Solving the World's Food Crisis Without Making 'Frankenfood'

Feeding a growing population without deforesting the planet for cropland is one of our world's greatest challenges. The solution, according to Newark-based Napigen, is to help the crops we have now produce more.

The use of genetically modified organism (GMO) plants is a common and controversial practice. Plants are made hardier, forced to produce more or resist pests and bacteria by introducing a new element to the plant's DNA. DNA determines the information available for building and maintaining an organism, similar to the way in which letters of the alphabet appear in a certain order to form words and sentences.

But the work Napigen does is different from other gene-editing work intended to produce higher yields. That's because the company is changing the DNA in the plant cell's mitochondria (the powerhouse of the cell), not the organism itself. The company is not introducing a new element — just changing what is already there.

President and CEO **DR. HAJIME SAKAI** says he got the idea by studying corn plant hybridization. High-yielding plants are made by crossing two different types of parent plants. Corn plants are easy to modify by cutting the tassel off the top of one plant and using the tassel from another type to create the hybrid seed.

Plants like wheat also have male and female parts, but those parts are within one flower and nearly impossible to separate. By changing DNA in the mitochondria, the scientist can change the sex of the plants from male and female to just female. The female-only plants can then be pollinated by another plant to create a seed for a new "elite" hybrid plant.

The process of creating the new plants is what happens over many years in nature, says Sakai. His company is just speeding up the process. Plants modified through the mitochondrial process are not considered GMOs for purposes of sale, he says. "We are not creating Frankenfood."

DR. HAJIME SAKAI

Napigen has successfully completed the process in yeast and is now starting to test with wheat, but the possibilities don't stop there.

"Our approach has broad applications in agriculture, industrial biotechnology, human health care," says Sakai. "We believe this technology can be harnessed to address a wide range of challenges from improving crop yields — resulting in protecting our environment by reducing the need for new farmland — to treating mitochondrial diseases."

Sakai jokingly describes his company as "a stupid idea" that worked. The founders had no data, just the knowledge that no one had tried their approach before and the combined knowledge to build the technology. Sakai and his co-founders are all scientists let go from DuPont Pioneer during the huge downsizing of 2015.

"I'm glad I can tell you this kind of story today," says Sakai. "We were patient enough." *—Kim Hoey*

Perdue Farms: Using Tech to Make Chicken Processing More Humane

Keeping chickens' stress levels low is good business for Perdue Farms. The calmer the bird, the easier it is to process, the fewer bruises and abrasions it has, the better it tastes.

"Also, it's the right thing to do," says Diana Souder, director of corporate communications and brand PR.

To reduce the stress, Perdue invested $22 million in new technology to build the first-of-its-kind, controlled atmosphere stunning (CAS) system and live bird handling process at its Milford facility.

With the CAS system, birds are introduced to increasing levels of carbon dioxide as they travel in crates through a dark, five-section tunnel. The carbon dioxide calms and then sedates the chickens, bringing them ultimately to an irreversible loss of consciousness prior to processing.

"The birds transition easily from conscious to unconscious," says **DEAN WALSTON**, director of operations at the Milford Facility. Windows into the tunnel show the birds standing, then sitting and finally lying down as they go through the system. The percentage of oxygen vs. carbon dioxide is monitored on computer screens throughout the process.

Before using the CAS system, the birds were stunned using an inefficient and sometimes ineffective method of electrical stunning. The processing room was kept dark to help keep the birds calm. Dust stirred up by chickens flapping their wings after ineffective stunning created potential respiratory problems for the workers. The new processing room is brightly lit.

"Since implementing the CAS system, we're seeing measurable poultry welfare improvements throughout the process, as well as improvements in product quality," says Bruce Stewart-Brown, senior vice president of food safety, quality and live production. "The birds stay calm and are never handled when conscious."

The CAS is one piece of an overall technology upgrade at Perdue as part of an extensive program to advance animal care.

DEAN WALSTON

The other part of the system takes place on the farms, where a newer, more sanitary crate system is used to transport birds in covered trucks. Air temperature of the crates during transport can be monitored remotely and adjusted as necessary by opening and closing vents on the truck.

On arrival, the crates are taken to a fully enclosed, temperature-controlled de-stressing area prior to processing. Because the crates are larger than those previously used, more chickens can be moved at one time, allowing forklift operators to move more slowly so birds do not become startled.

Perdue is also testing mechanical poultry catching machinery, a system of conveyor belts that move through the chicken house quietly and quickly to get the birds to the crates.

Using all the new systems, theoretically, the birds could go from chick to processing plant without ever being touched by human hands.

"It's much easier on the catcher, on the chicken and on the farm," says Walston. The system became fully operational in late 2019 in Milford. Over the course of several years, Perdue plans to convert all of its processing plants to CAS systems. *—Kim Hoey*

Hygiena: Innovating to Improve Food Safety

In the early 1990s, DuPont spun off a small outfit called Qualicon Diagnostics. It was based around a new food safety test — the RiboPrinter System, designed to identify and differentiate contaminating bacteria.

The spinoff soon added another product: the BAX System, designed to give quick results in testing for foodborne pathogens like salmonella, listeria and E. coli. By 2017, Qualicon had suffered layoffs; then, as part of the Dow-DuPont merger, it was sold to Hygiena, a California-based food-testing company.


SHANNON BULLARD


STEVE NASON

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

Hygiena moved Qualicon's manufacturing activity out to Camarillo; then, the firm invested millions in renovations at Boulden Circle in Wilmington last year, adding new office and lab space. It was a strong commitment to keep the heart of the Qualicon business in the First State.

"The science has stayed," says Hygiena Global Product Manager **SHANNON BULLARD**. "Now we have a clear home with a company whose mission is to keep the global food supply safe." The 30 employees at the Wilmington location continue research and development on BAX System products; the office also handles customer service and technical support for all of Hygiena, which has facilities around the world and sells in more than 90 countries.

Bullard notes that the strong concentration of PhDs in Delaware was a major factor in the decision to keep the R&D here. Adds Hygiena CEO **STEVE NASON**, "Science has been core to the BAX System for over 20 years, and our scientists are invaluable to the business. Hygiena's world-class team of scientists have made Delaware their home, and as a result Hygiena chose to invest in building a world-class laboratory for our scientists to develop new, innovative products and applications."

Hygiena's other major product line besides the BAX System tests for Adenosine Triphosphate (ATP), essentially to confirm sanitation procedures at food processing and manufacturing facilities are effective. Through acquisitions in 2018 and 2019, the company also added food allergen testing; sterility testing for ultra-high pasteurization systems in the dairy industry; and mycotoxin testing, which looks for certain kinds of molds in food. And, in addition to food safety, the company deals in water quality, health care and other industries.

"Our mission," says Bullard, "is to be the global leader in rapid industrial diagnostic testing by providing innovative technologies that are simple, easy to use and accurate, with excellent customer service and support."

And, while the BAX System is celebrating two decades on the market, Hygiena is busy rolling out a new innovation, developed in Wilmington. The new product, SalQuant, uses polymerase chain reaction (PCR) testing to provide quantified data about how much of a pathogen is present at a food manufacturing or processing facility. Traditionally, PCR testing has only sought a binary result — either pathogens were present, or they were not. "We were the first ones that brought PCR food testing into the marketplace, which increased the speed of results for the end user, so now they could get a result in days instead of weeks," says Bullard. Having quantified test results will enable food manufacturers and processors to take action to reduce salmonella at their facilities and reduce the likelihood of foodborne illness.

Hygiena believes the new product will mark a step forward in the food safety business. "For over 20 years, food manufacturers have trusted the BAX System for accurate detection of the presence of pathogens in their products," says Nason. "In the poultry industry, regulators have been working with industry to reduce the prevalence of salmonella. With Hygiena's introduction of BAX System SalQuant, poultry producers now have rapid, actionable and quantifiable data to improve interventions and the safety of their products from farm to fork." *—Matt Ward*

LiteCure: Using Lasers to Treat Cancer, Create Alternatives to Opiates

In the span of a week earlier this year, **BRIAN PRYOR** — CEO of Newark-based LiteCure — attended a veterinary conference in Las Vegas to talk about treating cancer with lasers, then flew to the NFL Combine in Indianapolis, where he gave a 30-minute talk on how teams can best use lasers to treat injured players. Pryor's business, founded in 2006 and now home to about 100 employees, is divided into a medical division and a veterinary division, and both units are thriving.


BRIAN PRYOR

"They're both growing. Medical's growing a little faster," says Pryor, noting that the medical division was slower getting off the ground because insurance does not typically cover laser therapies. But, with a recent shift in that market, the division is growing. "With physical therapy," Pryor explains, "cash pay is becoming very popular, so we're really riding that growth in the medical side."

"On the veterinarian side," Pryor notes, "we've almost saturated the market for veterinarian lasers in the U.S. — it's a household name, when you go into a vet's office." LiteCure's most recent innovation sounds like health care from the future. "We just launched a product," Pryor says, "where we're using lasers to excite gold nanoparticles to kill cancer."

Right now, the procedure is being used around the country to cure dogs of cancer. Traditional surgery is not a great option for mass cell tumors located, for example, on a dog's legs or face — the surgery can result in amputation or leave the animal with issues breathing or eating. Under LiteCure's new technique — called Companion Nanotherapy — the animal is given an intravenous infusion of gold nanoparticles the day before the procedure. Then, the day of the procedure, the dog visits the vet. "They put a laser probe on the surface of the tumor — it's about a 10-minute treatment — and it kills the tumor, and the tumor basically falls off the next day," Pryor says. The nanoparticles attach themselves only to the tumor, and the laser heats just those particles, killing the tumor. The technology is now in clinical trials with human subjects, with that effort being led by a Houston firm called Nanospectra; LiteCure provided the lasers for the trial.

"It's next-gen health," Pryor says.

Pryor studied math and chemistry in college, and got his PhD in Physical Chemistry from the University of Pennsylvania. While there, his laboratory centered on laser research. Fast-pulse lasers were not commercially available at the time, so Pryor built them. After college, he worked in custom laser design; his first medical lasers were for hair removal. When Pryor was ready to start his own company, he partnered with Sean Wang, CEO of Newark-based B&W Tek. "It was kind of good timing," Pryor says. "I wanted to do something, and he wanted to make lasers for the end-user, so that's how we collaborated and started LiteCure."

> ***"[The vet puts] a laser probe on the surface of the tumor — it's about a 10-minute treatment — and it kills the tumor."*** *—Brian Pryor*

LiteCure started in Newark because of the connection with Wang. It's remained there because "the location is fantastic," Pryor notes. "I love the location, basically being able to get to Washington or New York in a couple of hours with Baltimore and Philly in between — it's very convenient for us."

LiteCure's physical therapy technology — which is in widespread use throughout college and professional sports — is called photobiomodulation. Essentially, the therapy involves using lasers to target injured tissue and reduce inflammation. Pryor notes that, as a pain treatment, photobiomodulation is gaining traction as an alternative to drugs. "With the opiate crisis," he says, "I think people are starting to open up to more non-pharmaceutical options." *—Matt Ward*

QPS: Helping Pharma Companies Develop Better Drugs

Founded in Delaware by Dr. Benjamin M. Chien in 1995, QPS has grown significantly in recent years. The firm still makes its home in Newark, where it has 300 employees, but it now employs a total of 1,200 at locations around the world.

Chien, who had worked at DuPont Pharmaceuticals, started QPS as a small molecule bioanalysis shop of three people. Today, the company's work includes cutting-edge gene therapy, an area of clinical research that is poised for a significant surge. The FDA has approved only a handful of gene therapy products, but there are currently more than 900 investigational new drug (IND) applications for ongoing clinical studies in the field.


KEVIN VERNAREC

As a whole, QPS has transformed into a full-service contract research organization (CRO), and the company works in all phases of pharmaceutical development, from drug discovery, to preclinical development, to clinical research.

"We basically cater to biotech and pharmaceutical companies globally to help them develop their drugs from test tube to the shelf," says **KEVIN VERNAREC**, senior vice president and global head, late phase clinical at QPS. "We provide the services that many of these companies don't have internally or if they have them internally, they don't have them to scale. So we can take compounds from pre-clinical stage, which is before it gets to humans, to testing, which is when it becomes viable to be tested in humans, and then we take it from there to find out if it's safe as medication, and then bring it to market with FDA approval or approval in another country."

The essence of the work, explains Vernarec, is evaluating how the body metabolizes a drug: "What happens to you, do you get any kind of reaction, in a positive or negative way, when you take that drug — in the simplest terms, that's what we do, and we do that from pre-formulation to market." QPS also helps its clients through the process of determining the best medium of delivery — oral capsule, oral tablet or transdermal injection, for instance — for a new drug.

With sustained growth and a global presence, Vernarec says it has been important for QPS to have a scalable model, one that adheres to the company's high standards and best practices. Recent openings have included a facility in the Netherlands to look at neurodegenerative diseases like Alzheimer's disease and Parkinson's disease; an early-phase clinical facility in Hyderabad, India; and a bioanalytical facility in Suzhou, China.

"QPS is focused on custom-build research," says Gabrielle Pastore, vice president of global marketing at the firm. "We pride ourselves on delivering flexibility, agility and speed to our clients, being large enough to handle their global projects, yet nimble enough to provide the one-on-one attention that each client needs and deserves."

The Delaware-built firm follows a two-tiered business plan that has included both organic growth and strategic acquisitions. QPS made a string of acquisitions from 2007 through 2013, picking up clinical trials units and bioanalysis labs in Missouri, Miami, Europe and India; a group of toxicology and clinical operations units in Taiwan; an outfit specializing in pre-clinical neuropharmacology (drugs affecting the nervous system) in Austria; and a dermatology lab in North Dakota, among others.

Overall, the company has historically been growing about 10 percent a year, says Vernarec. "The lab business is pretty healthy, we're trying to grow on the patient side," he notes, adding that, in addition to the laboratory work the firm is know for, "we're looking to grow our later-phase business and looking to grow our early-phase business, and we're trying to focus growth in gene therapy and in rare disease." —*Matt Ward*

INNOVATION BY THE NUMBERS

33%
Growth in bioscience and pharmaceutical entities in Delaware since 2014

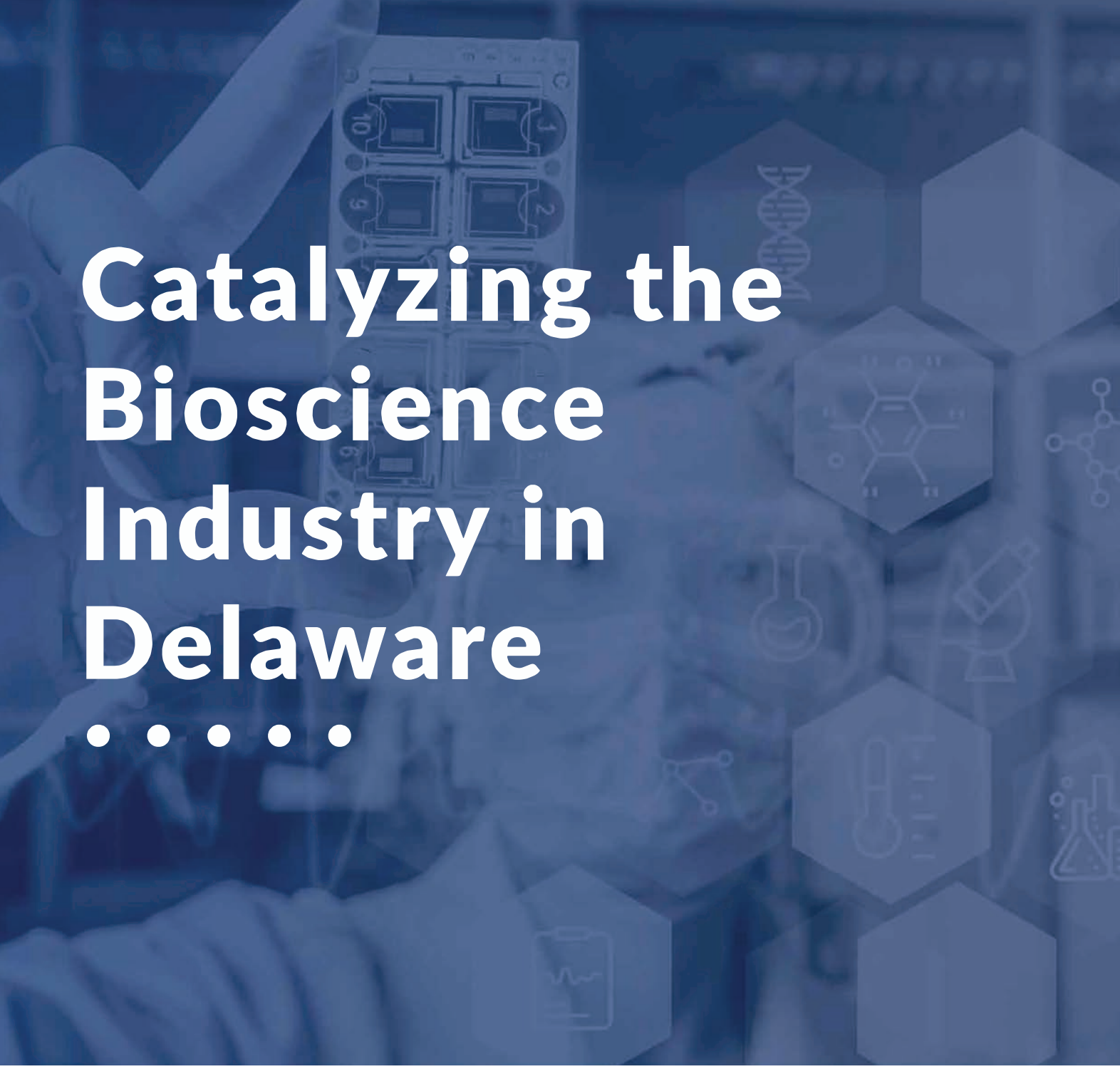
$61 Million
Amount of venture capital investments in Delaware bioscience companies since 2014

1.5 TIMES
the national average concentration of R&D workforce in Delaware

3
Delaware's rank out of the 50 states in terms of bioscience-related patents per capita, 2014–2017

8,000
Individuals employed in Delaware's bioscience industry

Source: Delaware Prosperity Partnership



Catalyzing the Bioscience Industry in Delaware

ACCELERATE

We offer personalized attention and resources that will enable members to solve problems and create new possibilities for business growth.

RESOURCES

The Bio Dome provides a place for meetings, events, group presentations and flexible, individual workspaces.

CONNECT

We deliver programs and events that build skills, expand networks and connect you to top-tier life science organizations in Delaware and the region.

SAVE

We'll provide access to our national BIO Business Solutions buying network that leverages the cumulative purchasing power of over 3,400 companies nationally.

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W.L. Gore: Taking a Successful Compound in New Directions

For the employees at W.L. Gore & Associates, the linear polymer ePTFE is the ultimate difference-maker; one that has allowed the 62-year-old company to stretch and expand in unforeseen ways, just like the compound itself.

The genesis story for ePTFE — expanded polytetrafluorethylene — was that Bob Gore, son of company founders Bill and Vieve Gore, one night in 1969 was trying without success to expand PTFE under heat. Finally, in frustration, he yanked the material. Under pressure, the polymer expanded by incorporating air while maintaining its original diameter.

In the half-century since, ePTFE has been the primary building block for much of Gore's large family of consumer and industrial products. "The monumental impact ePTFE continues to have, not just on Gore as an enterprise, but on thousands of other inventions across diverse industries, is truly revolutionary and immensely beneficial," Gore CEO Jason Field said in a statement recognizing the 50th anniversary of the discovery. The material is lightweight, porous, strong and versatile.

One of the newest applications is one that Gore calls "the latest breakthrough for thermal management in mobile devices." John Allen, technology leader for Gore's thermal insulation team, explains that "we debuted the application at the 2018 Consumer Electronics Show in a Dell XPS laptop. Since then we've incorporated it into mobile handsets."

Thin and flexible, Gore's ePTFE provides a layer of thermal insulation that guarantees lower thermal conductivity than air, thus improving the heat blocking and thermal spreading that occurs with the higher-powered batteries needed for the increasing miniaturization of hand-held consumer devices. It is especially useful in combination with heat spreaders such as graphite and copper. Sold in continuous rolls, the insulation can be shaped by standard lamination and die-cutting processes.

The potential market worldwide, Allen notes, is huge, as the product can be used in many consumer electronic mobile devices such as laptops, mobile phones, wearables, camera modules, tablets and AR/VR devices.

"We have a lot of direct customer engagement," Allen says, both in working with customer development teams "as well as keeping an eye on current trends such as miniaturization and the use of technologies such as 5G. When we go to trade shows, we ask, 'How fast are trends picking up?' and 'What are the challenges that will lead to new applications?'"

Additionally, Allen says that while it's financially desirable to work with large corporations such as Dell, "lots of innovative ideas come from small companies and startups, because they have the time and flexibility that large companies do not."

Using that approach to expanding the applications of ePTFE has led Gore to develop such well-known consumer products as "Gore-Tex" performance apparel, but also lesser-known industrial applications such as control systems for removing elemental and oxidized mercury from flue gas streams, undersea seismic cables, space and aerospace devices, and critical health care devices for the heart and lung.

For as long as possible, Allen wants to keep the ePTFE wheel spinning. "We have the flexibility to make product modifications," Allen notes, "but for the most part, we like to leverage the same base technology unless we see a new need."

—Roger Morris

INNOVATION **BY THE NUMBERS**

9
National ranking of the University of Delaware's chemical engineering program by *U.S. News & World Report*

$300 MILLION
Combined market capitalization of Delaware's chemical companies

$10 MILLION
Dollars expended annually by UD's Department of Chemistry & Biochemistry

2,991
Worldwide patents citing W.L. Gore's discovery of the ePTFE compound

Sources: Delaware Sustainable Chemistry Alliance, University of Delaware, W.L. Gore

We're With You

We're a part of Delaware, and Delaware is a part of us. That's why we created our Future of Chemistry Scholarship program, which provides local students with up to $40,000 to study science, technology, engineering, and math. That's why we built our Chemours Discovery Hub, our 300,000-square-foot research and development headquarters, on the campus of the University of Delaware. That's why we've invested in the renovation of Rodney Square and our global corporate headquarters in downtown Wilmington.

We support local non-profits, invest in local schools, and work with local businesses whenever we can.

Here's to building a bright future. Together.

chemours.com

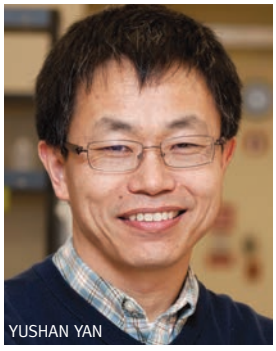
Chemours™

W7energy: Revolutionizing Fuel Cell Technology

For all the public excitement about different forms of alternative energy sourcing, such as solar and wind power, we often overlook the crucial part of the equation necessary to replace energy from high-carbon sources such as coal: How do you capture and store that alternative energy to bridge the gap between when it is generated and when it is needed?

It's a problem that has occupied much of the thinking of **YUSHAN YAN**, the Henry B. du Pont Chair in Chemical and Biomolecular Engineering at the University of Delaware and head of the startup W7energy. "The problem with renewable energy is that it is non-stable," Yan says, seated at a conference table in the company's offices at the Delaware Innovation Space.

As with many startups generated by research started at the university, W7energy is a team effort, with the core of the team consisting of Yan and current and former graduate students and post-docs. Critical to its growth, in late 2019 W7energy was awarded $3.4 million in new funding from the U.S. Department of Energy to advance and commercialize a new class of polymer membranes to make fuel cells considerably more economical.


YUSHAN YAN

The company has also generated $1 million in private funding as well as receiving a $100,000 EDGE Grant from the Delaware Division of Small Businesses.

"I've been working with fuel-cell technology for about 25 years, in the beginning on proton exchange like everyone else," Yan says. "But in the early 2000s, I realized that if you stay with proton exchange, it is difficult to get away from platinum, which is very expensive."

So Yan decided to move from an acid to a base environment, which is milder and potentially saves costs on many components. "You ask yourself, where to start," Yan says, "and the clear answer is with polymers." Around 2015, he began working with students on the idea of commercializing the concept and also on expanding the patent base, which is owned by the university. As a result, W7energy was officially launched in November 2017.

"We began with provisional patents and then expanded them," Yan explains. "It's a process called 'deciding whether you have gold or garbage.' If you can't find value within a 30-month period, do you want to continue spending money on it?"

This approach resulted in UD acquiring six patents around the technology in the U.S. It is currently trying to expand that to 11 countries or regions worldwide. The university is retaining a stake in the company and will receive royalties once commercialization begins.

Yan says the influx of funding will allow the company to operate "on an incremental scale" with its eight employees for at least another two years. "If we are doing okay in a year or two, we will need to scale up. Right now, our biggest potential customers are in Europe," he says. "Once we get a few thousand square meters of material, then we'll need to look at where to manufacture."

The process also has the promise of manufacturing clean hydrogen for multiple commercial uses.

"Right now," Yan says, "we're concentrating on our foundation — membrane technology. We want to focus on materials. Vertical integration can come later."

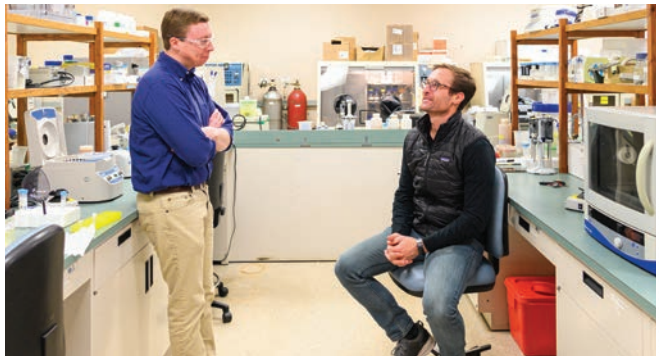
—Roger Morris

White Dog Labs: Harnessing Bacteria for Salmon Superfood, Human Health

At a facility in Nebraska, White Dog Labs' massive fermenters will soon hold bacteria by the ton, each of which will be busily converting sugar into more of themselves. After being dried out and filtered, the bacteria will be a protein-rich food source with a salty, mildly buttery taste.

"It's actually pretty good on popcorn," says **BRYAN TRACY**, CEO of Newark-based White Dog Labs. But these bacteria aren't meant for humans, at least not yet. Instead, they are bound for the gullet of farm-raised salmon. Tracy's company has recently signed a deal with Cargill, a major supplier of fish feed, for his company's bacterial food, called ProTyton. It's helping White Dog Labs build that facility, which is located inside an ethanol plant in Sutherland, Nebraska. It's slated to be producing ProTyton, mainly for Cargill, by mid-2020.

The deal promises to give White Dogs Labs a small role in satisfying the rising global demand for meat. Because wild-caught fish can't meet that pressure, farm-raised fish promises to be one potential solution.



MOONLOOP PHOTOGRAPHY

There are more opportunities to come. The Nebraska plant is expected to be just one-tenth the size of White Dog Labs' full-scale production in coming years. Tracy also plans to expand the company into the pet-food markets and eventually into human health.

The public is increasingly aware of how our microbiome — the diverse types of bacteria that inhabit our body — shapes our health. Tracy believes that's creating opportunities for companies like his to offer digestive supplements to the millions of Americans who struggle with symptoms like abdominal pain and constipation.

The bacteria grown by White Dog Labs is called clostridia, and it's one of the most recent varieties to be domesticated, so to speak. Earlier strains of bacteria, like E. coli, were mainly chosen because they thrive in a lab, though the advent of DNA sequencing has helped scientists learn what actually grows in our guts, Tracy says.

"We're going against the grain but have a strong scientific basis to justify doing this," he says. "We have an awesome opportunity to explore those organisms in the past that were unculturable."

For use in fish feed, clostridia were chosen for their high protein content.

Once they are removed from storage tanks and dried out, clostridia resemble corn meal, though somewhat finer. Clostridia is about 80 percent protein, making it a particularly nutritious element in a salmon's diet.

Perhaps the most tantalizing part of the White Dog Labs story is its potential scope. Fish are only the beginning. Enlisting bacteria as a nutritional supplement has promise in pet food and human medicine as well.

The bacteria's high protein content is helpful for animal feed, and clostridia produce butyric acid, which has a number of digestive benefits. In these applications, clostridia will be a live supplement.

Tracy says he doesn't plan on selling bacteria as a medicine. Instead, he's looking at a niche of savvy customers who see the benefits clostridia could offer.

"I'm saying I know a healthy gut would have a lot of this, so here you go," he says of clostridia.

The bacterium also has other promising applications for human health, including the prevention of Clostridium difficile infections, which kill an estimated 29,300 Americans per year.

For all their reputation, bacteria are exemplars of sustainability. Give them some basic building blocks and a carbon source and they can make their own food. Harnessing them as microscopic bacterial factories may be again helping scientists push the boundaries of sustainability.

—Dan Linehan

FundingFuel: Turning Consumers into Investors

During his time working at a venture firm, **PEDRO MOORE** had seen plenty of people gain stakes in various businesses, and he wanted something like that for himself.

There was only one problem.

"I didn't have the bank account to do it," he says.

Moore figured there were people out there like him with the desire to own portions of businesses but not the ability to make sizeable investments, so he and a partner started FundingFuel, an "equity crowdfunding" company that allows people to make modest investments in portfolios of franchises and earn income in the short and long terms.


PEDRO MOORE

The beauty of it is that investors can get a piece of a franchise for only $1,000. Even better: it is done entirely online. Just as many financial transactions have moved from in-person to the computer and phone, so does FundingFuel permit people to join up digitally.

"Mobile computing has changed many different things for the consumer," says John Collins, one of the founders of the First State FinTech Lab. "People want things at their fingertips more than ever before. They don't even want to go to a portal on a computer."

Moore started laying the foundation for FundingFuel in 2018 with the initial goal of allowing everyday people to invest in franchises. Since the fees for franchisees can be steep, there aren't many people with the wherewithal to own them completely. Those who have some money and interest can augment their income by participating.

Moore reports there are some conditions that must be met in order to be considered an "accredited investor" for FundingFuel. Individuals must have $1 million net worth, excluding their primary residence. Or, they can have an annual income of $200-250,000. It swells to $300,000 for married couples. Franchisees benefit because those who invest in their businesses can provide needed capital for improvements.

"Investors can cherry-pick what kind of franchises they invest in," Moore says.

FundingFuel is using Amazon's AWS as a platform. "It's one of the preferred choices when building a startup," Moore says. Eventually, he wants the company to use technology that allows participants to be able to transfer money directly from their bank to a fund. The goal is to make the entire process quick and smooth. If it's possible to apply — and gain approval — for a credit card in five minutes, and mortgage applications have been streamlined considerably, making this kind of investment for those qualified should be easy also.

The returns on investments can vary. Some people can gain an equity stake, while others are able to reap a guaranteed annual return on their investment over a certain period of time. It depends on the type of franchise involved — hotel, restaurant, etc. — and what the individual is looking for. The flexibility, combined with the ease of operation, will provide opportunities for a personalized experience.

"We wanted to create something for people who wanted to invest in a franchise but didn't want to go out and find opportunities," Moore says. "Time is a precious commodity. It would be amazing if someone could log in, browse through companies, and if they saw something they liked, they could lock it in." —*Michael Bradley*

INNOVATION **BY THE NUMBERS**

75%
Percentage of fintech investment in the greater Philadelphia region that has gone to Delaware firms

199
Number of fintech patents assigned to Delaware-based individuals and companies, 2009–2018

1
Delaware's rank among the 50 states, in terms of concentration of financial services jobs

NEARLY 170,000
Amount of financial-services industry workers in the Wilmington area alone

Source: Delaware Prosperity Partnership

JPMorgan Chase: Betting on Tech as the Future of Finance

Technology has become a competitive differentiator across the financial sector, and there's arguably no better example of this than JPMorgan Chase.

The company has spent $11 billion on tech initiatives and 20 percent of its workforce is comprised of software engineers, according to **DIANE ROGERSON**, the bank's Delaware technology leader.

Rogerson works out of JPMorgan Chase's Delaware Technology Center campus, which employs more than 3,400 tech analysts.

"It helps where Delaware is located," she says. "That's big in attracting talent. Chase is bringing more branches to the Mid-Atlantic region and Delaware."

Technology has become a huge part of the customer experience for JPMorgan Chase, even for those who are visiting branches. Rogerson reports that the company's ATMs allow people to do "70 percent of what they can do" in a brick-and-mortar office. Those who do go inside will meet tellers using tablets and digital tools to make the banking experience easier and more secure.

"We want to give our customers technology they are comfortable operating," she says. "We are finding that by showing them how to use technology, we can increase their ease with banking."

DIANE ROGERSON

That improved customer experience goes well beyond the branch visit. Thanks to a large growth in machine learning, JPMorgan Chase is able to help those calling for customer service to be routed more quickly and efficiently based on data gathered and analyzed from previous encounters, be they in person, online or over the phone.

"It makes for a more cohesive end-to-end customer experience," Rogerson says. "It allows us to track the trends of activity of customers."

As JPMorgan Chase works to improve the daily connection it has with customers across a variety of platforms, it realizes no amount of technological advancement can succeed without a strong network of security behind it. Rogerson reports the company has partnered with a variety of software companies throughout the fintech universe to create more products designed to keep customers' information and money safe.

Although the hackers continue to move at a quick pace in their efforts, JPMorgan Chase is getting better and more proactive in its ability to thwart their attempts to gain access to sensitive data. Rogerson says JPMorgan Chase has spent more than $600 million on cybersecurity efforts.

"We're using technology to help improve our responses in network security, e-mail security and how to protect the bank from ransomware and malware," Rogerson says.

> ***"We want to give our customers technology they are comfortable operating. We are finding that by showing them how to use technology, we can increase their ease with banking."*** *—Diane Rogerson*

One thing JPMorgan Chase is particularly proud of as it continues its technological growth is its partnerships with Delaware institutions to help find talent it can employ in that pursuit.

"We have worked with the community on different levels," Rogerson says. "We are working with colleges and outlets like [Wilmington-based coding program] Zip Code. Those are fantastic resources for us, and a win-win solution. We are able to make an impact in the region. That's a key for us in our differentiation as an institution." *—Michael Bradley*

Bayhealth: Boosting Cancer Care with a Tech Collaboration

Living in southern Delaware used to mean being some distance away from highly specialized medical care. For example, Milford is about 100 miles and almost two hours' drive away from the research hospitals in Philadelphia.

But residents of Sussex and Kent counties no longer have to miss out on the diagnostics knowledge and medical care available in urban areas. For example, the Bayhealth Cancer Center, located at its hospital in Dover, provides anyone in southern Delaware with access to first-rate cancer genetics counseling via its Telegenetics videoconferencing program, offered through Bayhealth's affiliation with the University of Pennsylvania's Abramson Cancer Center.


DR. RISHI SAWHNEY

"Bayhealth's genetics collaboration with Penn started in 2013, when a real need arose for genetics counseling for cancer patients," says **DR. RISHI SAWHNEY**, medical director of the Bayhealth Cancer Institute. "Patients with higher genetic risk really need to undergo counseling, and such counseling is generally available only in major population centers."

Bayhealth and Penn decided early in their collaboration to stage a formal clinical trial to evaluate whether genetic counseling via teleconferencing would be successful, and, if so, how such counseling would be conducted. "We needed to know if it would work and whether the patients in the trials would be satisfied," Sawhney says. Once both institutions reviewed the outcome of the trial, a formal setup was established in 2015.

The first step is taken at the local level by Bayhealth's medical staff, who need to decide which patients might benefit from genetics testing, whether they are currently being treated by Bayhealth physicians or referred by other doctors. "For example, one of the red flags might be with younger patients who develop multiple cancers," Sawhney says. "Another red flag would be a patient who has multiple family members who have had cancer."

Once a patient has been identified, the first Telegenetics session lasts an hour to 90 minutes, with a discussion of the patient's medical and family background and the pros and cons of genetic testing. "There might be a menu of options discussed, and, if a decision is made to move to testing, a program would eventually be customized for the patient," Sawhney says. A nurse then draws samples from the patient to be diagnosed.

The next session requires the presence of an oncology physician from Bayhealth at the teleconference. "Results of the testing would be discussed, as well as how the patient should be medically managed," Sawhney says. A treatment roadmap would be sent to the physician overseeing the patient's treatment.

"Our Telegenetics program is rapidly expanding," Sawhney continues, "and our cancer patients are eligible for any of Penn's clinical trials. Sometimes, we find a rarer mutation in a patient, and we can leverage Penn's expertise and that of its genetic tumors board."

The Telegenetics program is only one part of the cooperative care arrangement between Bayhealth and Penn, which also includes working together in orthopedic and cardiovascular care. Additionally, Penn's graduates often serve their medical residencies at Bayhealth. "We see other possibilities for Telegenetics beyond cancer," Sawhney says, "including possible pre-natal counseling." *—Roger Morris*

INNOVATION **BY THE NUMBERS**

322
Number of active clinical trials underway in Delaware

11,856
People employed by the ChristianaCare health system

$440,000
Grant amount awarded to Delaware's Resonate Forward by the Michael J. Fox Foundation for developing an innovation to improve Parkinson's disease patients' lives

165 ACRES
Size of Bayhealth's expansion in Milford, enhancing Sussex County's identity as a fast-growing hub for health care

Sources: CenterWatch, ChristianaCare, Delaware Prosperity Partnership, Resonate Forward

ChristianaCare: Advancing Gene Editing Through In-Vitro Approach

Even after 20 years of leading research into gene-editing techniques and applications, ChristianaCare's Gene Editing Institute continues to advance the science.

Examples include recently pioneering a new technique to better evaluate unintentional damage done during gene repair, developing a potential pathway to allow chemotherapy in


BRETT SANSBURY


ERIC KMIEC

late-stage lung cancer patients and devising an educational kit to better explain and teach gene therapy to students.

Much of this work is being led by the institute's largely younger, female staff of researchers. For example, **BRETT SANSBURY** has not even finished her doctorate at the University of Delaware, and her undergraduate degree is in biological chemistry, with a specialization in agrochemical precursors — not the standard background for a researcher in gene editing. Yet she is lead author in two recent journal articles explaining the advances in CRISPR gene editing being made by her and her colleagues at the institute.

CRISPR (clustered regularly interspaced short palindromic repeats) is a family of DNA sequences found within the genomes of prokaryotic organisms such as bacteria and archaea and is becoming a primary tool in gene therapy. Sansbury's work using a novel approach to in-vitro gene editing has resulted in a methodology that better identifies unintended and potentially harmful changes or mutations during CRISPR editing. It may serve as a platform that simplifies the theoretical and hands-on educational tools used to teach genetics to even high school students.

"We were the first to approach CRISPR in quite this manner," says **ERIC KMIEC**, director of the Gene Editing Institute. "Brett was the right person to do this work. There were not a lot of quantitative studies in the past; rather, it has been more about phenomenon."

"I've always liked solving problems," Sansbury laughs in explaining her approach to research. "Math is my friend, and chemistry is my friend."

It is also an approach that Kmiec says characterizes the 22-person institute, most of whose staffers are researchers, not practicing physicians, and most of whom "are young and female. They don't settle for an answer. They want the right answer."

Another institute program is seeking to treat patients with late-stage non-small-cell lung cancer, testing whether using CRISPR to disable a particular gene would allow standard chemotherapy to work better and longer. Clinical trials for the treatment will begin soon, using newly formulated FDA guidelines.

"This would not be a cure for late-stage lung cancer," Kmiec emphasizes, "but it could hopefully extend [patients'] lives by a few months" that might allow them to participate in important family events. The therapy might eventually be applied to pancreatic cancers as well.

Finally, another colleague, **NATALIA RIVERA-TORRES**, has translated Sansbury's work into an educational kit, which will be marketed shortly, to train the next generation of genetic scientists.

The kit was developed with educational input from faculty and students at Delaware Technical Community College using a $1 million National Science Foundation grant.

—Roger Morris


NATALIA RIVERA-TORRES

Resonate Forward: Helping Parkinson's Patients Move More Easily

Anyone who has had a family member or friend with Parkinson's disease knows the problem: The person with the disease suddenly stops walking as if frozen to the spot, and it may take minutes before their muscles finally respond to the body's command to continue moving.

Of the estimated one million people in the U.S. living with Parkinson's and suffering its symptoms, about 60 percent experience freezing, but medications have minimal effect on the condition.

As "freezing" is one of the most frustrating manifestations of the devastating disease, it became a natural target of research at the University of Delaware's Parkinson's Clinic at STAR Campus. Under the early leadership of Ingrid Pretzer-Aboff, at the time a member of the Health Sciences faculty and now on the nursing faculty at Virginia Commonwealth University, a team developed "PD Shoe," which utilized a remote-controlled electronic stimulation device within the patient's footwear. Now that technology has been much-refined and is in the process of being taken to market by the startup Resonate Forward, under the brand name "VibeForward."

"About three years ago, I was at the Parkinson's Clinic and met Professor Pretzer-Aboff and saw the work that was being done with PD Shoe at that time," says **THERESA LITHERLAND**, a co-founder and president of Resonate Forward. "I've been working in Parkinson's for 20 years and hadn't seen anything like that in a long time. So I said, 'Let's start a company!'"

Resonate Forward came a step closer to bringing the therapeutic shoe to market with a $440,000 grant awarded early last year by the Michael J. Fox Foundation.

Simply explained, VibeForward is a lightweight, battery-powered, electronic device that fits into the patient's footwear and provides an electronic stimulus by means of vibration. Its microprocessor is activated by a smartphone app. Not only does the device cause therapeutic stimulation, it also has sensors that log data — 10 times per second — on things like the pace and direction of movement and pinpoint the time at which a patient gets stuck. This information can later be accessed for evaluation and possible action by a physician or clinician.

Freezing or gait trials will get underway this summer with Parkinson's patients at Virginia Commonwealth, which is also doing tremor trials for Resonate Forward under the direction of Pretzer-Aboff. "A patient in trials can use VibeForward for 20 minutes a day, three times a week," Litherland says. Initial results seem to indicate that stimulation from the vibration may be helping to "retrain" a physical response mechanism in the patient that lessens freezing for up to two weeks, although that still needs to be clinically proven.

THERESA LITHERLAND

From a business development standpoint, Litherland says Resonate Forward is actively seeking angel funding to continue work made possible by the Fox foundation grant. The company's early funding came via the Horn Entrepreneurship Blue Hen Proof-of-Concept program and Delaware's Established Program to Stimulate Competitive Research (EPSCoR). "We license the technology through the [University of Delaware's] Office of Economic Innovation and Partnerships," which will get royalties once VibeForward is commercialized, says Litherland. Any improvements made by Virginia Commonwealth would be licensed to that university, Litherland says.

Once the clinical trials are completed, the results will be evaluated by the FDA. "The technology has worked well in trial therapy, so I cannot see VibeForward not coming to market," Litherland says. *—Roger Morris*

BUSINESS PROFILE INDEX

DeNovix Inc.

Fred Kielhorn, CEO

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DeNovix Inc. is a Delaware based company that designs, manufactures and sells instrumentation for the life science industry. Founded in 2012, our focus is on providing innovative products and award-winning customer support.

DeNovix products include the DS-11 Series Spectrophotometer / Fluorometer which was awarded 2017 and 2018 Reviewers' Choice Life Science Product of the Year as well as the prestigious Platinum Seal of Quality. The DS-11 Series provides rapid, user-friendly UV-Vis and fluorometric quantification of DNA, RNA and proteins - cornerstone techniques in life science labs.

The CellDrop™ Automated Cell Counter allows users to Count Cells Without Slides™. The instrument was named the Reviewers' Choice Best New Life Science Product of the Year for 2019 by scientists worldwide. Traditional cell counting requires disposable plastic slides or cumbersome manual counts using a hemocytometer and microscope. CellDrop features permanent surfaces that position the sample for counting. After measurement, the surfaces are simply wiped clean to make ready for the next count. Laboratory waste and costs are reduced when labs use CellDrop.

Our team has shipped thousands of instruments from Delaware to life science labs world-wide. Researcher reviews comment on our easy-to-use software, performance, smart-phone-like interface, rapid customer support and flexible connectivity of our instruments.

LEADERS IN INNOVATION

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Guiding pioneers
through the business of
chemistry and biochemistry.

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Chemistry pioneering is tough.

The chemical industry can seem overwhelming. Prosecuting patents, developing new products and securing customers in a complex marketplace requires a team with a pioneering mindset, drive and experience. Global competition demands that innovators have depth and breadth to successfully bring new products to market.

Technologists create forecasts for their products, and often find themselves wondering why their innovation is not gaining traction as expected. The Delaware Sustainable Chemistry Alliance (DESCA) specializes in outfitting innovators and their teams to make better decisions and get to market faster.

The future of the chemical, material, agri-science and industrial biology industries is in developing and commercializing innovative and sustainable technologies and building a new legacy of ChemTech as these industries evolve. DESCA programs support future prosperity by leading the way in these efforts.

Innovators: TechConnect, DESCA's flagship program for innovators, is a unique forum to meet domain experts and explore alternate routes to market. Together with our Tactics for Entrepreneurs workshops, we equip innovators and technologists with the entrepreneurial upskilling necessary to guide them to success.

Investors: Our annual Investor Forum invites pre-qualified, early-stage companies to present their innovations to potential investors and strategic partners.

Industry: Our annual conferences discuss industry needs, trends and opportunities with a focus on ChemTech and building a talent pipeline.

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Fostering a Security-Positive Culture
Diamond Cyber Edge is helping support customers with the complexities of staying current and securing your most valuable assets. Our cyber security experts believe you don't need an expensive platform or software package to better protect against threat, it starts with transforming your organization into a security-positive culture.

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There is nothing small about your goals and IT does not have to be complicated. Diamond Edge offers a comprehensive managed IT Support solution securing our customer needs with 24/7/365 remote & onsite support, cyber security programs, and CIO guidance. Currently, managing over 90 clients within the public and private sectors.

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Diamond creates innovative solutions across multiple platforms. We specialize in optimizing your business workflow to modernizing old legacy systems. We are here to guide and support all your business needs such as transforming cloud-enabling environments, intelligence automation and implementing new software. As leading experts in the industry, we are certified in the most current solutions across Microsoft, Salesforce, Azure, AWS, Citrix, Oracle, MUNIS, e-gov't and IBM technologies.

As a company, it is important to consider your environment may already be compromised. Contact us now to identify, isolate and minimize the extent of a cyber threat.

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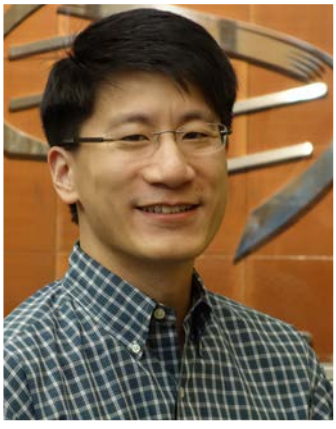
The National Institute for Innovation in Manufacturing Biopharmaceuticals



Kelvin H. Lee, Institute Director

NIIMBL The National Institute for Innovation in Manufacturing Biopharmaceuticals

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Newark, DE 19713

302-831-0663

Niimbl.org

The heart of biopharmaceutical manufacturing innovation is in Newark, Delaware.

Located on the University of Delaware's STAR Campus, the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) is a public-private partnership dedicated to advancing biopharmaceutical manufacturing innovation through technology and workforce development. Fueled by the collective expertise of 150+ organizations, NIIMBL develops rapid, flexible, and cost-efficient manufacturing technologies and supports advancements in world-leading biopharmaceutical workforce development.

Innovative Technologies

We tackle the challenges faced by the biopharmaceutical industry in getting life-saving treatments to patients faster. Our technical projects include innovation in analytical testing, upstream and downstream processing, and continuous manufacturing approaches for cell and gene therapies, vaccines, and therapeutic proteins.

A Future Workforce

Through industry and academic collaboration, we support education programs for students, career-changers, and military veterans delivered through hands-on, virtual, and hybrid training opportunities.

A Hub of Innovation

Our state-of-the-art headquarters in the new Ammon Pinizzotto Biopharmaceutical Innovation Center is designed to foster collaboration, research, and welcome the biopharmaceutical community to test drive innovations.

An Expert Community

The spirit of partnership among our diverse leadership and community allows academic institutions as well as small and medium-sized companies to work closely with industry leaders to bring new innovations to life.

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(866) 337-1533

www.solenis.com

Solenis is recognized globally for a legacy of technology innovation, which sprung from our roots in Delaware at the Wilmington Research Center. There, teams of chemists and engineers develop new ways to improve customers' products and processes, as well as developing technical solutions that enhance monitoring, dispensing and optimizing the feeding of our specialty chemicals. Worldwide, about 260 researchers, including approximately 70 experts with doctoral or master's degrees in a variety of fields, have at their disposal a vast selection of comprehensive paper-testing and water analysis equipment and innovative process-testing instrumentation. Two-thirds of the company's technology focus is on new products and our goal is to consistently generate one-fourth of our revenues from products less than five years old. Recognizing that technology innovation is best done by working closely with current or prospective customers in real-world environments, we operate additional laboratories in strategic locations: Paulína, Brazil; Shanghai, China; Charlotte, North Carolina; Krefeld, Germany; Barendrecht, the Netherlands; Antwerp, Belgium; Tangerang, Indonesia, and Terrassa, Spain. The company holds more than 2,000 patents and recent recognition includes winning in the NextGen Cup Challenge for recyclable and compostable coatings, and the French Paper Industry Technical Association's Palme d'Or for digital intelligence.

RESOURCES

(Continued from page 104)

DELAWARE STATE CHAMBER OF COMMERCE
www.dscc.com
Michael Quaranta
info@dscc.com
302-655-7221
The state's chamber helps businesses of all sizes in Delaware achieve success through a variety of educational programs and business services, including legislative advocacy, communications and publications, small-business benefits and services, and networking events.

GREATER DELMAR CHAMBER OF COMMERCE
infochamber@comcast.net
302-846-3336
The chamber represents businesses in and around this Sussex County town.

GREATER GEORGETOWN CHAMBER OF COMMERCE
www.georgetowncoc.com
Kevin Thompson
info@georgetowncoc.com
302-856-1544
The chamber represents businesses and organizes events in and around historic Georgetown.

LEWES CHAMBER OF COMMERCE AND VISITORS BUREAU
www.leweschamber.com
Betsy Reamer
inquiry@leweschamber.com
302-645-8073
The chamber promotes businesses and tourism in the area where the Delaware Bay and Atlantic Ocean meet.

MIDDLETOWN AREA CHAMBER OF COMMERCE
www.maccde.com
Roxane Ferguson
info@maccde.com
302-378-7545
The chamber is dedicated to the economic development of the Southern New Castle County area, providing advocacy, leadership and networking to the business community.

MILTON CHAMBER OF COMMERCE
www.historicmilton.com
Michael Clark
chamber@historicmilton.com
302-684-1101
The chamber promotes businesses in and around historic Milton, birthplace of five governors.

NEW CASTLE COUNTY CHAMBER OF COMMERCE
www.ncccc.com
Bob Chadwick
info@ncccc.com
302-737-4343
The chamber creates business-development opportunities for members and advocates for a strong economy throughout the county.

REHOBOTH-DEWEY BEACH CHAMBER OF COMMERCE
www.beach-fun.com
Carol Everhart
rehoboth@beach-fun.com
302-227-2233
The chamber promotes business and tourism in these lively, scenic resorts.

WESTERN SUSSEX CHAMBER OF COMMERCE
www.westernsussexcoc.com
Terry Carson, Suzanne Barger
admin@westernsussexcoc.com
302-629-9690
Located in Seaford, the chamber serves as the voice of Western Sussex County businesses.

DELAWARE STATE CHAMBER OF COMMERCE:

A Voice for Innovation in Dover and Beyond

www.dscc.com

The Delaware State Chamber of Commerce (DSCC) has represented the First State's business community since 1837 and serves more than 1,000 members.

"Our goal is to help create an economic environment that encourages growth, competitiveness and stability for all businesses," says DSCC President Michael Quaranta.

The State Chamber team meets regularly with Delaware's Congressional delegation and plays a leading role in bringing issues before the General Assembly in Dover on behalf of its members, supporting policies that encourage innovation and opposing policies that may hinder it. The community can stay up-to-date on the Chamber's advocacy efforts by texting "DSCC" to 50457 or visiting www.DSCC.com/takeaction. Another tool is www.DSCC.com/daily, which curates the stories, events, policies and information that is of great interest to its members — all in one place.

The State Chamber also serves an important role in connecting Delaware's business and community leaders with each other. "We help our members forge new relationships through networking and events to foster innovative collaboration and progress within the business community," says Quaranta.

DSCC's premier networking event is its Annual Dinner each January. The event is attended by more than 1,000 business leaders, elected officials and state dignitaries.

INDUSTRY AND NETWORKING GROUPS

AMERICAN CHEMICAL SOCIETY (ACS) - DELAWARE SECTION

www.delawareacs.org
Erin Kennedy
erin.m.kennedy@dupont.com
302-695-8421
ACS is an industry membership organization and a leading source of scientific information. Programs such as Project SEED and the ACS Scholars Program help provide an entry point into the chemical sciences for high-school students and undergraduates.

CHEMICAL INDUSTRY COUNCIL OF DELAWARE

www.delawarechemistry.com
Josh Young
cicd@americanchemistry.com
202-249-6223
This membership organization for companies that manufacture chemicals and petrochemicals advocates on behalf of the industry in Dover and beyond.

THE COMMITTEE OF 100

www.committeeof100.com
Jennifer Kmiec
info@committeeof100.com
302-654-6115
This nonprofit association of Delaware business leaders works together to promote responsible economic development. Members can attend networking events and serve on committees that correspond to their industry or interests.

DELAWARE BANKERS ASSOCIATION

www.debankers.com
Sarah Long
sarah.long@debankers.com
302-678-8600
A trade association offering professional development for members of the banking industry.

DELAWARE BIOSCIENCE ASSOCIATION

www.delawarebio.org
info@delawarebio.org
302-635-0445
The association's mission is to catalyze the growth of Delaware's bioscience industry. To that end, it facilitates connections, puts on events, helps members get better purchasing deals, and advocates at state and federal levels.

DELAWARE BIOTECHNOLOGY INSTITUTE (DBI)

www.dbi.udel.edu
Alok Patel
alok@udel.edu
302-831-6165
DBI supports research and development in the life sciences at all of Delaware's research organizations, including universities and health systems.

DELAWARE BUSINESS ROUNDTABLE

www.dbrt.org
Robert Perkins
rwperkins16@aol.com
302-545-1795
The roundtable is a volunteer organization of CEOs who collectively employ more than 75,000 Delawareans. It promotes commerce, job creation and select public policy issues.

DELAWARE ELECTRIC COOPERATIVE

www.delaware.coop
Kevin Yingling
kyingling@delaware.coop
302-349-3120
Founded by farmers in the 1930s to bring electrical infrastructure to rural areas of Delaware, the co-op is today known for its energy savings programs.

DELAWARE FARM BUREAU

www.defb.org
Richard Wilkins
richard.wilkins@defb.org
302-697-3183
Promotes Delaware agriculture through education and advocacy.

DELAWARE HEALTHCARE ASSOCIATION

www.deha.org
Wayne A. Smith
wayne@deha.org
302-674-2853
Delaware's state-wide trade and membership organization for hospitals.

DELAWARE MANUFACTURING ASSOCIATION (DMA)

www.dscc.com/dma.html
Michael Quaranta
info@dscc.com
302-655-7221
DMA, an affiliate of the Delaware State Chamber of Commerce, serves as an advocate for manufacturers at state and local levels.

DELAWARE MANUFACTURING EXTENSION PARTNERSHIP (DEMEP)

www.demep.org
Rustyn Stoops
info@demep.org
302-283-3131
DEMEP helps Delaware manufacturers stay competitive in a changing global marketplace by providing resources that enable them to acquire and apply technologies, utilize new resources, reduce waste, streamline processes and drive sales growth.

DELAWARE MUNICIPAL ELECTRIC CORP. (DEMEC)

www.demecinc.net
Heather Contant
hcontant@demecinc.net
302-653-2733
DEMEC represents nine municipal electric distribution utilities and has invested significantly in renewable energy.

DELAWARE SUSTAINABLE CHEMISTRY ALLIANCE (DESCA)

www.desustainablechem.org
Dora Cheatham
info@desustainablechem.org
302-233-8034
DESCA promotes sustainable and innovative technologies by helping entrepreneurs in the chemical, material, agriscience and industrial biology sectors move their ideas from concept to commercialization.

DELAWARE SUSTAINABLE ENERGY UTILITY (DESEU)

www.energizedelaware.org
Tony DePrima
tony.deprima@deseu.org
302-883-3048
DESEU's Energize Delaware initiative helps homeowners, businesses and government entities fund and implement energy improvements.

DELMARVA POULTRY INDUSTRY, INC.

www.dpichicken.org
Holly Porter
porter@dpichicken.org
302-856-9037
An 1,800-member trade association advocating for the poultry industry in Delaware and the Eastern Shores of Maryland and Virginia.

DELAWARE BUSINESS ROUNDTABLE: Dedicated to Driving Economic Growth

www.dbrt.org

The Delaware Business Roundtable is a non-partisan, volunteer consortium of CEOs whose companies collectively employ more than 75,000 people in Delaware.

Since its inception in 1981, the Roundtable's broad mission has been to enhance the quality of life in Delaware by promoting commerce, job creation and select public policy issues. In recent years, the Roundtable also has been a leading supporter of public education transformation and entrepreneurs in Delaware.

Members include executives from many Delaware companies including CSC, Christiana Care, ILC Dover, Bayhealth, Capital One 360, Delmarva Power, WSFS, M&T, JPMorgan Chase and DuPont.


BOB PERKINS

"We are committed to promoting economic prosperity and growth," says Executive Director **BOB PERKINS**. "The Roundtable provides leadership on broad public policy issues that are critically important to Delaware's economy, and we encourage policymakers to relentlessly focus on ways to create jobs and promote commerce statewide."

The Roundtable was instrumental in laying the groundwork for the creation of the Delaware Prosperity Partnership, the public-private economic development body that is working to expand the state's economy by attracting jobs, talent and capital investment.

Since its inception, the Delaware Prosperity Partnership has put a strong leadership team in place and is busy working to bring jobs to Delaware by welcoming businesses of all sizes and creating an even more welcoming business climate.

These goals align with the Roundtable's Delaware Growth Agenda, which outlines three overarching goals for the state:

1. Create and nurture an entrepreneurship and innovation ecosystem
2. Create a new approach to economic development via a public-private partnership
3. Improve the state's overall business climate.

To achieve these goals, the Roundtable advocates for public policies that improve the business environment in Delaware, strengthen the state's long-term finances, bring about meaningful change in public education, provide a focus on opioid/substance abuse in the workplace, and create a safe and welcoming environment in all Delaware communities. Most recently the Roundtable released a report by international consulting firm KPMG that recommended steps Delaware should take to improve its permitting effectiveness and thereby become more competitive in attracting jobs, talent and investment to Delaware. The report led to the creation of the Ready in 6 Coalition, a statewide group of business organizations dedicated to improving Delaware's competitiveness.

"Delaware is a great place to live and do business," Perkins says. "We must all work together to ensure our economy is growing and we are creating a welcoming environment for businesses, their employees and their families so we can be an economic leader for generations to come."

FIRST STATE FINTECH LAB
www.firststatefintech.org
John Collins
info@firststatefintech.org
302-373-8225
The organization's primary mission is to establish Delaware as a national leader in the fintech industry by nurturing the industry's growing ecosystem.

FRUIT AND VEGETABLE GROWERS ASSOCIATION OF DELAWARE
delawarefruitvegetable.wordpress.com
Dr. Gordon Johnson
gcjohn@udel.edu
302-856-7303
A nonprofit organization working to encourage improvement in the production and marketing of fruit and vegetable products in Delaware.

INSPIRING WOMEN IN STEM
www.inspiringwomeninstem.com
Jennifer Kmiec
inspiringwomeninstem@gmail.com
302-689-3032
Inspiring Women in STEM was created to deliver high-quality professional-development programming and conferences. Its mission is to encourage, support and inspire female scientists, engineers and other STEM professionals.

MEDICAL SOCIETY OF DELAWARE
www.medicalsocietyofdelaware.org
Mark Thompson
mark.thompson@medsocdel.org
302-366-1400
The Medical Society advocates on behalf of physician members across the state.

THE NATIONAL INSTITUTE FOR INNOVATION IN MANUFACTURING BIOPHARMACEUTICALS (NIIMBL)
niimbl.force.com
Barry Buckland
info@niimbl.org
302-831-0663
NIIMBL's mission is to advance biopharmaceutical manufacturing and develop a highly skilled workforce for the industry.

PRODUCE MARKETING ASSOCIATION
www.pma.com
Cathy Burns
302-738-7100
A trade organization representing companies in the fresh-produce and floral supply chain.

SOCIETY OF FINANCIAL SERVICE PROFESSIONALS — DELAWARE CHAPTER
www.sfspde.org
Peter Gaertner
pgaertner@affinitywealth.com
302-254-6121
Dedicated to building a robust network of financial professionals throughout the state.

TECH FORUM OF DELAWARE
www.techforumde.org
Janet Reed
info@techforumde.org
302-384-9775
The Tech Forum's goal is to help entrepreneurs identify business opportunities and build profitable relationships around the region.

This mission is supported with monthly programming, alternating between educational seminars and professional networking.

INTELLECTUAL PROPERTY, INCORPORATION AND PATENT EXPERTS

Delaware's deep landscape of experts in intellectual property, trademarks, patents, incorporation and other corporate services makes it a destination for companies of all sizes, as well as researchers working to bring their innovations to market.

CSC
www.cscglobal.com
Rod Ward
info@csc-usa.com
302-636-5400
CSC helps businesses with a range of compliance needs, including business licensing and trademark registration.

HARVARD BUSINESS SERVICES
www.delawareinc.com
Richard Bell
rickbell@delawareinc.com
302-645-7400
Harvard Business Services has been helping companies incorporate in Delaware for more than 30 years, assisting more than 150,000 corporations and LLCs during this time.

INCNOW
www.incnow.com
John Williams
agents@incnow.com
302-575-0877
Run by two licensed Delaware attorneys, IncNow has helped entrepreneurs, startups, law firms, incubators and businesses get started for more than 40 years.

IP GROUP, INC.
www.ipgroup-inc.com
Michael Burychka
302-752-1055
An intellectual property commercialization company focused on evolving hard science, mainly from partner universities, into innovative businesses.

UNIVERSITY OF DELAWARE OFFICE OF ECONOMIC INNOVATION AND PARTNERSHIPS
www.oeip.udel.edu
David Weir
dsweir@udel.edu
302-831-7140
The office's mission is to guide entrepreneurs from ideas to the marketplace, facilitating patent applications and other steps in setting up a business.

WORLDWIDE INCORPORATORS
www.worldwideincorporators.com
Jennifer Toscano-Goetz
sales@worldwideinc.net
302-477-0500
Worldwide helps businesses navigate all aspects of incorporation, including filing a Certificate of Authority or forming an LLC in any of the 50 states.

FINANCING AND BUSINESS DEVELOPMENT SUPPORT

Whether you're hoping to invest in Delaware, start a business or grow an existing business in the state, Delaware's solid network of funders, contractors and economic-development organizations can help.

DELAWARE.MONEY
www.delaware.money
This site aggregates information about the wealth of financial resources available in Delaware, allowing users to search for the agency that best fits their financing needs.

DELAWARE DEPARTMENT OF STATE, DIVISION OF SMALL BUSINESS
business.delaware.gov
Joe Zilcosky
business@delaware.gov
302-739-4271
The state's business-development arm connects small businesses and entrepreneurs with resources to help them start, grow and succeed. It also works to attract new businesses to Delaware and help them get established here.

DELAWARE PROSPERITY PARTNERSHIP
www.choosedelaware.com
Kurt Foreman
innovate@choosedelaware.com
302-924-8871
This public-private partnership leads economic-development efforts for the state, tapping into private-sector expertise along with state resources.

DELAWARE PTAC (PROCUREMENT TECHNICAL ASSISTANCE CENTER)
www.delawareptac.org
Dr. Walt Blaney
info@delawareptac.org
302-831-0781
PTAC connects businesses with the information and resources they need to navigate the complex government-contracting process. Its services are provided at little or no charge.

DELBIZ ON MAIN
www.delawaremainstreet.com
Patricia Cannon
patricia.cannon@delaware.gov
302-577-8485
DelBiz on Main is part of the Delaware Division of Small Business and a Main Street America Coordinating Program. It focuses on helping businesses take advantage of opportunities for revitalization and development in Delaware's towns and cities.

EXPORT DELAWARE
export.delaware.gov
Beth Pomper
export@delaware.gov
302-577-8464
Export Delaware provides First State companies with the resources they need to expand into overseas markets. That includes organizing overseas trips to meet potential customers.

FINANTA
www.finanta.org
Michael Alles
finanta@finanta.org
267-236-7000
This nonprofit, community-based lender provides funding up to $50,000 to businesses in all three Delaware counties.

FIRST STATE INNOVATION
www.firststateinnovation.org
info@firststateinnovation.org
302-690-1260
First State Innovation focuses on increasing Delaware's entrepreneurial capacity by helping tech-based and early-stage businesses find seed capital, alternative funding, skilled staff and other resources.

GROW DELAWARE FUND
www.growdelawarefund.org
Qadeer Gulzari
info@growdelawarefund.org
302-658-4171
This consortium of private, public and nonprofit organizations provides small and medium-sized businesses with access to favorable financing terms.

INNOVATION CAPITAL ADVISORS
www.innovationcapital.com
David Freschman
info@innovationcapital.com
302-777-1616
This early-stage venture capital management firm invests in startups and growth-stage tech companies, with a focus on SaaS, e-commerce, HR and education software, healthcare IT, media, advanced chemicals and materials.

KENT ECONOMIC PARTNERSHIP
www.kentpartnership.org
info@ccded.com
302-678-3057
The partnership works to attract new businesses to the area, while ensuring that established companies continue to thrive.

LEADING EDGE VENTURES
www.leadingedgevc.com
Rick Birkmeyer
rick@leadingedgevc.com
302-452-1120
Leading Edge Ventures provides financing and guidance to launch-imminent entrepreneurs and those seeking capital to expand.

MID-ATLANTIC DIAMOND VENTURES GROUP
www.fox.temple.edu/institutes-and-centers/mid-atlantic-diamond-ventures
Ellen Weber
ellen.weber@temple.edu
215-204-4605
Mid-Atlantic Diamond Ventures Group (MADV), located at Temple University's Fox School of Business, helps emerging, tech-based companies by better positioning them for funding. MADV hosts coaching sessions, helps with preparing investment materials and provides input around entrepreneurship and scaling.

NEW CASTLE COUNTY OFFICE OF ECONOMIC DEVELOPMENT

www.nccde.org/756/economic-development
Tamarra Morris
tfmorris@nccde.org
302-395-5959
The office's main priority is to help new, developing and existing businesses grow and contribute to the local economy. That includes helping local and national companies navigate government regulations and the permitting process.

SBDC (SMALL BUSINESS DEVELOPMENT CENTER)

www.delawaresbdc.org
Sarah Mailloux
delaware-sbdc@udel.edu
302-831-1555
The Delaware SBDC is part of the University of Delaware's Office of Economic Innovation and Partnerships (see page 97). Both organizations are guided by a mission to develop the university and state's entrepreneurial, technology and business community.

SCORE DELAWARE

delaware.score.org
Usha Gopalratnam
contact.0042@scorevolunteer.org
302-433-6995
SCORE provides free, confidential, face-to-face interactions with certified business mentors.

SEEDCOPA + SEEDCODE

www.seedcopa.com
Sherwood Robbins
srobbins@seedcopa.com
610-321-8241
Supported by federal, state and local agencies, Seedcopa + SeedcoDE's loan programs help businesses in Pennsylvania and Delaware grow and create jobs. Possible benefits include a long-term, below-market fixed interest rate and less money out of pocket.

SUSSEX COUNTY ECONOMIC DEVELOPMENT

www.excitesussex.com
Bill Pfaff
econdev@sussexcountyde.gov
302-855-7770
This agency is dedicated to advancing business in 25 Sussex towns, including the renowned beach resorts.

SUSSEX ECONOMIC DEVELOPMENT ACTION COMMITTEE (SEDAC)

www.sedac-de.org
Joe Conaway
jconaway@hotmail.com
302-500-8049
Located within eight hours of a third of the eastern U.S. population, Sussex County offers an array of opportunities for businesses. SEDAC is committed to helping businesses get established, expand and continue to thrive.

U.S. SMALL BUSINESS ADMINISTRATION — DELAWARE DISTRICT OFFICE

www.sba.gov/offices/district/de/wilmington
John Fleming
john.fleming@sba.gov
302-573-6294
All the resources of the SBA — including loans and grants — are at your fingertips, located in the heart of Wilmington.

UNIVERSITY OF DELAWARE OFFICE OF ECONOMIC INNOVATION AND PARTNERSHIPS

www.oeip.udel.edu
David Weir
dsweir@udel.edu
302-831-7140
The office's mission is to guide entrepreneurs from ideas to the marketplace, facilitating patent applications and other steps in setting up a business.

WILMINGTON ECONOMIC DEVELOPMENT CORPORATION/DELAWARE COMMUNITY DEVELOPMENT CORPORATION

www.wedco.org
Terri Duke
info@wedco.org
302-571-9088
These organizations provide financing for growth and expansion to businesses in Wilmington and all of Delaware, respectively.

FIRST STATE INNOVATION: Accelerating Business Connections

www.firststateinnovation.org

First State Innovation (FSI) was founded in 2006 to accelerate Delaware's and the surrounding region's entrepreneurial economy by connecting people, ideas and capital. Early on, the organization held dozens of events featuring new and emerging companies. This helped highlight the importance of the entrepreneurial sector at a time when there was little interest in it. Since then, the general awareness of entrepreneurism in Delaware has grown dramatically and many initiatives are now underway to help grow the entrepreneurial economy. This has helped lead to an impressive increase in entrepreneurial activity in Delaware and the surrounding region.

In 2015, FSI sponsored the formation of an early-stage venture fund. The fund, Leading Edge Ventures, raised $10 million for investments in early-stage companies, focusing on Delaware and the surrounding region. Over the past five years, the fund has invested in 15 early-stage companies. In 2017, FSI founded the Entrepreneur Roundtable, a forum where entrepreneurs meet to share ideas that improve one another's ventures and also grow the entrepreneurial ecosystem.

FSI also serves as a "voice of Delaware" in Pennsylvania, New Jersey and Washington, D.C., along with other economic-development organizations such as Select Greater Philadelphia and the University City Science Center.

Going forward, FSI will continue to collaborate with entities that grow the entrepreneurial economy in Delaware and the region.

WORLD TRADE CENTER DELAWARE
www.wtcde.com
Carla Sydney Stone
info@wtcde.com
302-656-7905
The Delaware branch of the World Trade Centers Association is a nonprofit that helps Delaware companies succeed in the global marketplace in every sector — from agriculture to tech to defense.

CONTRACT MANUFACTURING/ RESEARCH ORGANIZATIONS

ADESIS
www.adesisinc.com
Peter Foytlin
pfoytlin@adesisinc.com
302-323-4880
Adesis is a CRO supporting the pharmaceutical, chemical, biomaterials and catalysts industries. Areas of expertise include custom synthesis, R&D and specialty manufacturing.

DELAWARE BIOSCIENCE ASSOCIATION
www.delawarebio.org
info@delawarebio.org
302-635-0445
The association has a comprehensive resource guide for contract providers. It can be found at www.delawarebio.org/industry-resources/resource-guide.

QPS
www.qps.com
Gabrielle Pastore
gabrielle.pastore@qps.com
302-369-5274
QPS works with an international network of scientists, investigators and professionals to ensure a customized approach to each clinical study.

STRIDE
www.stride2future.org
Dr. Debora Flanagan Massouda
pfas@stride2future.org
STRIDE's deep bench of industry experts provides help with developing new products and applications, exploring new chemistries and concepts, proving concepts, overcoming process obstacles and solving manufacturing problems.

SYNCHROGENIX
www.synchrogenix.com
Paul Thompson
contactus@synchrogenix.com
302-892-4800 (main number)
973-729-4450
Synchrogenix, a division of Certara, helps clients accelerate the regulatory submissions of medical innovations worldwide with support services that include strategy, communication, operations and technology.

WILMINGTON PHARMATECH
www.wilmingtonpharmatech.com
Feng Han
info@wilmingtonpharmatech.com
302-737-9916
Wilmington PharmaTech specializes in chemical process research, analytical method development and validation, trace chemical analysis, solid-state polymorphic screening, and discovery studies for the pharmaceutical and biotech industries.

SUPPORT SERVICES FOR SMALL AND DISADVANTAGED BUSINESSES

DELAWARE CENTER FOR ENTERPRISE DEVELOPMENT AT DELAWARE STATE UNIVERSITY
business.desu.edu/centers/delaware-center-enterprise-development
Lillie Crawford
lcrawford@desu.edu
302-857-6954
DESU helps entrepreneurs start and grow businesses through training programs, technical and managerial assistance, and by providing access to capital.

DELAWARE COMMUNITY DEVELOPMENT CORPORATION (DCDC)
www.wedco.org/loanprogram.php
Terri Duke
info@wedco.org
302-571-9088
DCDC provides long-term, low, fixed-interest-rate financing to small businesses. Loans can be used to buy land, build and renovate buildings, or purchase equipment.

DELAWARE DIVISION OF SMALL BUSINESS, OFFICE OF SUPPLIER DIVERSITY
business.delaware.gov/osd
Michelle Morin
michelle.morin@delaware.gov
302-857-4554
The Office of Supplier Diversity is your clearinghouse for information about getting certified as a diverse supplier and taking advantage of state procurement opportunities. The Division of Small Business also provides access to a directory of organizations assisting small businesses, which is at business.delaware.gov/find.

DELAWARE HISPANIC COMMISSION
www.delawarehispanic.org
Sonia Aguilar
sonia.aguilar@state.de.us
302-672-6850
The commission's Hispanic Business Development Program provides technical training, business mentoring and access to capital to ensure equitable opportunities for Hispanic-owned businesses.

LAUNCHER
www.launcherde.org
Qadeer Gulzari
launcher.de@gmail.com
302-658-4171
This free training course, held in English and Spanish, covers marketing, branding, financial planning, how to write a business plan and other crucial entrepreneurial skills.

$TAND BY ME
www.standbymede.org
Mary duPont
mary.dupont@state.de.us
302-255-9245
$tand By Me provides Delawareans with financial coaching services, with a special focus on immigrants and adults with disabilities.

UNIVERSITY OF DELAWARE VENTURE DEVELOPMENT
www.udel.edu/research-innovation/horn
Dan Freeman
hornprogram@udel.edu
302-831-4393
The University of Delaware's venture support and commercialization program provides a whole spectrum of guidance and services to members of the UD community pursuing innovative business ideas.

DELAWARE TECHNOLOGY PARK: A Hand up for Early-Stage Companies

www.deltechpark.org

Delaware Technology Park (DTP) is a leading East Coast nonprofit research park that provides development-stage companies with access to the resources and connections they need to succeed. DTP is a partnership between the State of Delaware, the University of Delaware (UD) and the private sector.

The first company to set up shop at DTP in 1992 was DuPont. Since then, the park has housed more than 100 companies, including 50 that have graduated. Graduates of DTP have moved to commercial locations but maintained operations in Delaware. As an example, Wilmington PharmaTech expanded to three sites, including purchasing a former DuPont facility in Glasgow. QPS Pharmaceutical Services has grown from a small lab to over 1,200 global employees and become the anchor tenant of DTP.

The Delaware Biotechnology Institute (DBI) and Fraunhofer Center for Molecular Biotechnology are two world-class organizations in DTP conducting cutting-edge research in life sciences. In 2017, DBI's former director, Dr. Kelvin Lee, led a large national consortium to win the largest grant UD ever received. The grant with match totaled $250 million and resulted in the creation of the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL). A new $156 million building dedicated to NIIMBL will include many of the core centers now within DBI and opens in 2020 on UD's STAR Campus.

"We take pride in the many innovative technology companies thriving and creating jobs in our state," says **MIKE BOWMAN**, DTP's president. Altogether, DTP has helped facilitate more than 16,000 jobs for Delaware's economy, both within the park and around the area. The cumulative private investments and academic and company research grants have exceeded $1 billion.

JUSTIN HEYES/MOONLOOP PHOTOGRAPHY

MIKE BOWMAN

In 2016, DTP's footprint expanded with DTP@Star, a laboratory incubator on STAR Campus, for Delaware's most promising young companies. The incubator offers access to world-renowned research facilities and faculty as well as student interns. To date, 18 new companies have started, with new technologies in chemistry, therapeutics and materials. "DTP@STAR represents the very best of an academic, public and private partnership to further technology and economic development through support of early-stage companies," says Bowman.

In 2019 DTP, UD and Discover Bank announced plans for a 100,000-square-foot FinTech Building on STAR Campus, to open in 2021. UD's College of Engineering and Lerner College of Business and Economics will occupy half of the building and the other half will be for early-stage companies involved in financial services, cybersecurity and specialized digital technologies.

WOMEN'S BUSINESS CENTER (WBC) AT TRUE ACCESS CAPITAL

www.firststateloan.org/womens-business-center
Sarah Crawford Jones
wbc@firststateloan.org
302-652-6774
The WBC provides intensive business training, including courses on business plans, financing, social media and marketing analysis. Entrepreneurs also have access to mentoring from successful women business owners.

CO-WORKING SPACES, INCUBATORS, ACCELERATORS

Companies just starting out in Delaware, or established employers looking for flexible, temporary space, have plenty of options to choose from.

1313 INNOVATION

www.1313innovation.com
Lauren Spinelli
lspinelli@1313innovation.com
302-407-0420
More than 10,000 square feet of co-working space, including shared space, dedicated desks, private offices and conference space. Tenants benefit from 24/7 access, networking events, workshops and other educational opportunities.

ARTIST AVE STATION

www.artistavestation.com
Nataki Oliver
artistavestation@gmail.com
302-312-0172
Co-working space with personal desks and conference table on the first floor, with an artist makerspace in the basement. Personal desks and a conference table can make way for art showings and other events. A basement entrance allows easy transport of art and materials.

BARREL OF MAKERS

www.meetup.com/barrelofmakers
Kim Givens
jst@barrelofmakers.org
Community-center makerspace for different skills and ages, offering woodworking, electronics, robotics, computer programming, 3D printing and design, glass etching and welding.

DELAWARE INNOVATION SPACE
www.deinnovates.org
Bill Provine
info@deinnovates.org
302-200-8600
Offers 100,000 square feet of state-of-the-art, multi-use lab space, plus 155 private and shared offices. Also offers mentoring by field experts, funding assistance, grant application support, networking, and marketing guidance.

DELAWARE TECHNOLOGY PARK (DTP)
www.deltechpark.org
Michael Bowman
jmbowman@udel.edu
302-452-1100
DTP offers affordable office and lab space at its original campus and at UD's STAR Campus (DTP@STAR).

EMERGING ENTERPRISE CENTER
www.eecincubator.com
info@eecincubator.com
302-294-2056
More than 5,000 square feet of co-working and meeting space. Tenants benefit from business-plan assistance, business-growth training, one-on-one mentoring and networking.

THE HUB @ 1201
www.stat.international/office-solutions/the-hub-at-1201
Mary Ann Menders
mmenders@stat.international
302-884-6746
Co-working space with shared, dedicated and private office space. Classes on various topics, as well as networking opportunities and mentorship.

KENT COUNTY EMERGING ENTERPRISE DEVELOPMENT CENTER
www.kentpartnership.org
James Waddington
james.waddington@co.kent.de.us
302-678-3028
Co-working space with shared, dedicated and private office space. Tenants receive mentorship, plus help with business plans and skills, and have networking opportunities.

MIDDLETOWN BUSINESS INCUBATOR & COLLABORATIVE WORKSPACE
www.mbide.com
Roxanne Ferguson
info@maccde.com
302-378-7545
A 3,300-square-foot facility that can accommodate 10 to 15 businesses in meeting and retail space, storage and offices. Offers mentorship, business-plan development, capital assistance and networking opportunities.

THE MILL
www.themillspace.com
Rebecca Parsons
rebecca@themillspace.com
302-751-6455
Shared, dedicated and private office space is available, along with conference and event space, including a 225-person theater. Guest speakers and networking events add to the offerings. Locations at 1007 North Orange Street and 3411 Silverside Road.

NEXTFAB
www.nextfab.com
Anna Solomon
info@nextfab.com
302-477-7330
Offers access to 2D and 3D printers, design software, a laser cutter, digital circuitry tools and a woodworking shop, alongside offices, studios and communal space. Tenants benefit from a 12-week accelerator program or nine-month incubator program, business coaching, networking and funding opportunities.

WIN FACTORY
www.winwilmington.com
Tamara Varella
info@winwilmington.com
302-250-0175
This co-working and event space helps businesses get to the next level with its Wealth League, which offers curated events, meet-ups and opportunities to be coached by successful entrepreneurs.

THE DELAWARE PROSPERITY PARTNERSHIP: Where the World Chooses to Do Business
www.choosedelaware.com

This year is a significant one for Delaware, with strong economic and employment growth.

Since its formation in 2017, the Delaware Prosperity Partnership (DPP) has made considerable progress in advancing its four-pillar mission:

1. attract new businesses to the state;

2. retain and engage existing businesses as they make plans for expansion;

3. build a stronger entrepreneurial and innovation ecosystem and

4. assist employers and various partners in addressing talent pool issues.

DPP's focus on enhancing Delaware's culture of innovation has supported more mature, existing enterprises such as Solenis, as well as promising enterprises in the early stages of growth, such as Prelude Therapeutics. With one of the highest per-capita patent rates in the country, ranking second for lowest cost of doing business and sixth on the U.S. State Innovation Index, Delaware continues to attract entrepreneurial innovators, including high-tech ag, advanced chemical manufacturing and fintech.


KURT FOREMAN
JOE DEL TUFO/MOONLOOP PHOTOGRAPHY

"At DPP, we believe that encouraging innovation and entrepreneurism will benefit not only the more seasoned businesses that call Delaware home, but also encourage innovators from around the globe to choose Delaware for building on their next big idea," says **KURT FOREMAN**, president and CEO of DPP.

ADESIS

COURTESY OF ADESIS, INC.

RESOURCES

MEMBERSHIP ORGANIZATIONS AND INDUSTRY GROUPS

Delaware's innovation economy is supported by a diverse infrastructure of chambers of commerce, networking groups and industry associations.

CHAMBERS OF COMMERCE

BETHANY-FENWICK AREA CHAMBER OF COMMERCE
www.thequietresorts.com
Lauren Weaver
info@bethany-fenwick.org
302-539-2100
This chamber promotes businesses in what are collectively known as "The Quiet Resorts."

CENTRAL DELAWARE CHAMBER OF COMMERCE
www.cdcc.net
Judy Diogo
info@cdcc.net
302-734-7513
The chamber's purpose is to advance economic development by promoting the civic, industrial, commercial, agribusiness and social interests of the community. Its mission also includes enhancing the freedom of private business to operate competitively and with minimal regulation.

CHAMBER OF COMMERCE FOR GREATER MILFORD
www.milfordchamber.com
Jo Schmeiser
milford@milfordchamber.com
302-422-3344
The chamber supports the economic development of the Greater Milford area.

DELAWARE SMALL BUSINESS CHAMBER OF COMMERCE
www.dsbchamber.com
Bob Older
bob@dsbchamber.com
302-482-2120
The chamber supports small businesses — those with 100 or fewer employees — throughout the state and in surrounding communities.

(Continued on page 93)

DELAWARE BUSINESS TIMES EVENT CALENDAR

DBT40
DELAWARE ACHIEVERS & INNOVATORS UNDER 40
DELAWARE BUSINESS TIMES EVENTS

October 2020

The DBT40 Awards program recognizes 40 of Delaware's most accomplished leaders under 40 years old, for their Professional Accomplishments, Community Service, Leadership and Vision.

FOBA
Family Owned Business Awards

November 2020

The Family Owned Business Awards program honors family owned businesses that make up the backbone of the American economy.

WOMEN in BUSINESS

December 2020

Delaware Business Times and *Delaware Today* present the annual Women in Business Luncheon honoring women for their accomplishments coupled with a speaker program.

AMERICA'S SBDC DELAWARE

Quarterly 2020

Delaware Business Times has partnered with the Small Business Development Center (SBDC) to produce a four-part business series focusing on the unique goals, challenges and questions of small business owners.

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90 IN 90
IDEAS MINUTES

January 2021

Walk away with the collective wisdom and expert advice from 9 leaders in the business community. 90 ideas that will help you strengthen your business to the next level.

BOOK OF LISTS

March 2021

Celebrate with the companies that made the "List". Mix and mingle with growing companies in multiple industry verticals to build your network.

FASTEST 50
DELAWARE BUSINESS TIMES EVENTS

July 2021

Honoring 50 of Delaware's fastest growing companies at a black tie optional dinner.

For sponsorship information, please contact
Advertising@delawarebusinesstimes.com or 302.504.1276

DELAWARE BUSINESS TIMES

Delaware's talent powers a world of technology & innovation

Located in the heart of the Mid-Atlantic, Delaware's location provides access to the best and brightest in the advanced chemicals and bioscience industries. We boast the highest concentration of chemical engineering jobs in the country and a 60 percent growth rate in life science companies in the past decade.

What powers this diverse workforce? Nationally ranked academic and health systems right here in Delaware, as well as direct access to 100-plus colleges and universities within two hours' commuting distance.

With the fourth-highest concentration of employed PhDs in science, engineering and health in the U.S., our talent pool runs deep with a highly trained and specialized workforce. When you think about cutting-edge technology and innovation, think Delaware.

A deep talent pool means innovation across all industries.
That's what you can expect from a state our size.

ChooseDelaware.com/sci-tech

DELAWARE PROSPERITY PARTNERSHIP