APPENDIX

NJ EDA
ECONOMIC DEVELOPMENT AUTHORITY

Full Testimony for Submission

Tim Sullivan, NJEDA Chief Executive Officer
Kathleen Coviello, NJEDA Chief Economic Transformation Officer
Assembly Science, Innovation, and Technology Committee
November 30, 2022

Chairman Tully, Vice Chairwoman Carter, Assemblyman DePhillips and members of the Assembly Science, Innovation, and Technology Committee, it is an honor to provide testimony today that discusses New Jersey's ever-growing innovation economy. Under Governor Murphy's leadership, New Jersey is poised to recapture our historic legacy of leadership in innovation and entrepreneurship, while simultaneously cultivating the most diverse and inclusive innovation ecosystem in America. I'd also like to thank the Committee for letting us hold today's hearing at the New Jersey Bioscience Center, our 50-acre research park located in the heart of the state's research corridor offers a multitude of lab and office space options for companies at all stages of growth. Today, the Center is home to 20 companies, including several prestigious tenants, and supports over $70 million in investments.

New Jersey is more than just a hub for innovation, it's a first mover – creating ground breaking programs that invest in entrepreneurs and companies looking to start, scale, and stay in state. These investments are contributing to our unprecedented economic momentum. In 2021, New Jersey moved back within the top ten states for venture capital invested after having fallen as low as 16th, and was recently ranked in a study conducted by Looka as one of the top three states in the nation to start a business. Additionally, business formation in New Jersey continues to grow, with the state experiencing a 15.9% increase in business filings from October 2020 - 2022.

In addition to these data points, New Jersey's momentum in innovation is evident in several major recent announcements:

New Jersey successfully competed against six other states to be the home of HAX's global headquarters for its partner accelerator program for pre-seed hard tech companies. This initiative, funded by Gov. Murphy's Strategic Innovation Centers program, is expected to create as many as 2,500 jobs in and around Newark in the coming years. New Jersey's success in securing leading innovation companies like HAX serves as a testament to our state's competitive advantage over leading locations like Silicon Valley for start-ups due to our unparalleled location, talent, diversity, education systems, and innovation ecosystem. By the numbers:

- HAX is set to create more than 2,500 jobs and develop 100 new startups over the next five years, bringing millions of dollars of capital to New Jersey's largest city, Newark.
- The Innovation Hub in New Brunswick, with more than 1.1 million square feet of research space, will serve as the center of life science innovation and medical education by providing state-of-the-art education facilities for medical students, collaborative space for researchers to study, create and commercialize their findings and products, and office-space for private-company tenants representing all of the life science ecosystem, including Big Pharma, little pharma, and biotech.
- Global fintech leader Fiserv is implementing plans to build a 3,000-job FinTech Innovation Center in Berkeley Heights.
- The New Jersey Wind Port, the first purpose-built offshore wind port in the United States, is set to bring over 1,500 ongoing jobs and currently supports hundreds of construction jobs in South Jersey.

This year, the New Jersey Economic Development Authority (NJEDA) opened the New Jersey Innovation Evergreen Fund (NJIEF), which establishes the state as an equity investor in startups deploying up to $500 million into companies alongside professional venture capital groups. In its first year, demand in response to

1 X

the NJIEF tax credit auction was so robust among the State's established corporate leaders that the NJEDA raised the available auction pool from $30 million to $50 million – showcasing the energy and interest in dynamic partnerships designed to attract innovators and venture capital to the state.

Under Gov Murphy's leadership, the EDA has developed the most progressive and potent suite of innovation tools in the nation, including significant enhancements to longstanding programs undertaken in the last several years. These programs, focused on strategic real estate investments, increasing access to capital for entrepreneurs, and growing our state's talent ecosystem, continue to make New Jersey one of the most desirable locations to live, work, and play. These initiatives include:

Investments in Strategic Real Estate

- $70 million for Strategic Innovation Centers, which will invest in accelerators, incubators, research centers, innovative service delivery centers or multitenant innovation clusters that bring innovators and research institutions together to advance innovation within targeted high-growth industries.
- NJ Ignite supports entrepreneurs by providing rent support grants for up to two, four, or six months. In addition, this program provides collaborative workspaces with a new tenant attraction tool.
- The New Jersey Bioscience Center is home to a 50-acre research park located in the heart of the state's research corridor, offering a multitude of lab and office space options for companies at all stages of growth.
- The Innovation Hub in New Brunswick is a research, business incubator and innovation center that will provide modern education facilities for medical students, collaborative space for researchers, and offices for private-company life science tenants.

Access to Capital for Entrepreneurs

- $10 million for Black and Latino startups designed to address and response to the systemic racial inequities in access to early-stage capital for Black and Latino entrepreneurs, a first in the nation commitment to equity in entrepreneurship.
- NJ Accelerate encourages the participation of New Jersey Entrepreneurs in high-quality accelerator programs, which increase the growing young, innovative companies in the state. This program, which provides funding opportunities for both Accelerators and Graduates, increases NJ deal flow for Approved Accelerators, expands access to best-in-class accelerators for NJ businesses, and simulates business growth.
- The New Jersey Angel Investor Tax Credit Program provides investors in a qualifying NJ emerging technology or life science business with a 20%-25% investment tax credit. As of June 2022, this program has provided 2,455 Angel Investments, $800 million in tax credits, and has supported 120 technology businesses.
- Technology Business Tax Credit Transfer (NOL) Program enables unprofitable NJ-based technology or biotechnology companies to sell a percentage of accrued losses to unrelated profitable corporations. Since inception, the NOL program has provided over $1 billion to more than 570 companies, providing a record $75 million to 24 early-stage companies this year alone.

Investments in Talent and Innovation Ecosystem

- $10 million for the Innovation Fellows Program which will offer mentorship and grants of up to $400,000 to teams of first-time entrepreneurs, providing individuals with the financial flexibility to follow their entrepreneurial dreams, regardless of socio-economic status.

2x

- New Jersey Founders and Funders which facilitates warm introductions between New Jersey's emerging technology companies and local investor community. To date, over 70 investors and more than 250 companies have attended and curated over 1,400 introductions through Founders and Funders events, with 10% of participating companies raising capital following attendance.
- Golden Seeds, which consists of an Angel investor group dedicated to funding high-potential, women-led businesses. In 2020, the New Jersey Chapter of Golden Seeds raised almost $4.5 million for companies, with 17 New Jersey companies progressing beyond office hours.

From Thomas Edison's creation of the lightbulb to Alice Parker's invention of home heating, New Jersey has a long history of investing in entrepreneurs that change our world for the better. As we continue our state's impressive legacy of leadership in innovation, I stand committed to working with you all to continue growing the companies of the future.

Thank you.

3x

FULL TESTIMONY FOR SUBMISSION

Assembly Science, Innovation and Technology Committee
November 30, 2022

Chairman Tully and Committee Members, thank you for the opportunity to provide input on early-stage R&D and entrepreneurship in NJ. My name is Judith Sheft, and I am the Executive Director of the New Jersey Commission on Science, Innovation and Technology (CSIT).

CSIT is responsible for strengthening the innovation economy within the State, encouraging collaboration and connectivity between industry and academia and the translation of innovations into successful high growth businesses. CSIT has a focus on early-stage innovation-based entrepreneurs in sectors including life sciences, clean energy/wind, advanced manufacturing and technology encompassing areas such as digital communication, information technology. Our programs are designed to amplify and accelerate positive commercialization outcomes.

CSIT creates linkages to enable entrepreneurs to successfully access critical federal resources such as SBIR/STTR funding and provides connections to capabilities in NJ academic and non-profit institutions. Diversity, equity, and inclusion is a key foundation as we strive to ensure that NJ's innovation economy is the most diverse in the nation increasing participation by women, underrepresented minorities, veterans, and LGBTQ+ innovators.

When CSIT was re-established in 2018, NJEDA helped to incubate the Commission. The relationship has been instrumental in enabling CSIT to launch its initiatives efficiently and effectively. CSIT programs complement NJEDA programs and many CSIT awardees have received NJEDA support as well.

While entrepreneurs are always looking to raise needed capital from dilutive and non-dilutive sources experience indicates they will require additional support to be successful. CSIT programs address these multiple needs with connections to resources and partners, training, and financial grant support. To assist with connections, the free RwNJ platform provides information on 5 partner institutions (Montclair, NJIT, Princeton, Rowan, and Rutgers with plans to extend to additional NJ institutions). Currently RwNJ contains information on close to 4,500 researcher profiles, 268K research outputs and 158 research facilities.

CSIT collaborates with the NJ Small Business Development Center on coaching/training for NJ entrepreneurs looking to obtain federal SBIR/STTR grants. NJ lags its neighboring states in obtaining SBIR/STTR funding. The NJ SBDC was recently awarded a FAST grant from the federal Small Business Administration to provide technical assistance. Last week an initial NJ SBDC/CSIT webinar was held with close to 200 attendees and this afternoon CSIT, NJ SBDC, BioNJ and the NIH are holding a webinar on translational research and SBIR.

CSIT has built a suite of funding programs for early entrepreneurs. Seed Grant and SBIR/STTR Direct Financial support programs are competitive and applicants with the highest scores receive awards. The R&D voucher programs are awarded on a rolling basis. CSIT grant programs include:

1. CSIT's initial grant program has been an SBIR/STTR Direct Financial program for companies that have received federal funding. We recently completed the 4th round and applications are in the process of being scored. The CSIT Direct Financial Assistance program provides $25K for companies that have had an initial Phase I award in the last 2

4x

years and $50K of bridge funding for companies that completed phase I and are awaiting to hear about a Phase II award. The Federal SBIR Phase 1 awards typically are for 9-12 months in duration and provide funding of approximately $250K, SBIR Phase II awards can be up to several million dollars for projects lasting between 1-3 years. Eleven federal agencies participate in the SBIR/STTR program which has an annual budget of $3.5B. In the 1st three rounds of CSIT Direct Financial Assistance $1.9M has been awarded to 66 NJ companies. 26 other states have similar SBIR/STTR support programs.

2. CSIT has a range of R&D Seed grant programs covering clean tech, life sciences (Including drug therapeutics and medical devices), technology, advanced materials, maternal and infant health, and food / ag innovations. Companies are able to receive awards of between $75K to $250K depending on the program topics area.

   CSIT's R&D Seed grant programs have been oversubscribed by 2-3X indicating a pent-up demand for early-stage funding to enable entrepreneurs to demonstrate capabilities that will allow them to be successful in obtaining follow on funding.

3. Clean Tech and Catalyst R&D voucher programs facilitate usage of core lab facilities at NJ universities, federal labs, and non-profit research institutions by NJ entrepreneurs. These facilities are too expensive for an entrepreneur to afford. R&D Voucher grants are awarded on a rolling basis and CSIT meets bi-weekly with core lab representatives to link applicants with appropriate facilities. The program has been extremely successful enabling applicants to get data needed to apply for federal grants and potentially enter into broader collaborations with the academic institutions. To date for the Clean Tech R&D Voucher program 10 applications have been approved with 8 in the pipeline. Awardees have utilized facilities at Montclair, NJIT, Princeton and Rutgers. For the Catalyst R&D Voucher Program 25 applications have been approved with 7 in the pipeline. Awardees have utilized facilities at Kean university, NJIT, Princeton and Rutgers.

CSIT programs have achieved positive economic outcomes for the NJ startup community. An initial economic impact assessment of the 1st two cohorts of 28 companies that have received CSIT STTR Direct Financial Assistance was conducted by NJIT with the following outcomes:

1. 43% of the companies, reported adding new employees for a total of 38 new employees - 29 full-time employees, 4 part-time employees and 5 interns
2. 50 % of the companies received new patents
3. 25% of the companies expanded office and/or lab space
4. In total the companies obtained an additional $12.2M in follow on investment, over 14x the CSIT direct financial assistance amount. The new investments were achieved in the form of grants, loans, and private company investments.

The vast majority of the companies that CSIT supports have 5 or fewer employees. Applicants have been located throughout the state and CSIT leverages connections with the African American Chamber, Statewide Hispanic Chamber, Veterans Chamber, and other organizations to increase the diversity of the applicant pool. More works needs to be including increased intentional targeted outreach to university tech transfer offices, and local chambers along with social media posting to relevant networking groups to raise awareness of CSIT opportunities. .

5x

Since its re-establishment CSIT has been a source of support and connections for NJ's R&D innovation intensive companies. Programs have been modified based on insights learned from the early pilots. Additionally with the significant R&D opportunities at the federal level from the CHIPs and Infrastructure act, CSIT has stepped up to drive coordinated NJ responses to large funding opportunities involving multiple academic and industrial partners.

I appreciate the opportunity to provide insights to the Committee.

6x

New Jersey Institute of
Technology
University Heights
Newark, NJ 07102-1982

Testimony to the New Jersey Assembly
Science, Innovation, and Technology Committee
from Dr. Angela R. Garretson
Chief External Affairs Officer
New Jersey Institute of Technology
November 30, 2022

Thank you, Chair Tully, Vice Chair Carter and members of the Science, Innovation, and Technology Committee on behalf of New Jersey Institute of Technology (NJIT), the State's public polytechnic university for the opportunity to offer testimony today regarding innovation and start-up ecosystems.

For our state to prosper, we must foster an innovation ecosystem where New Jersey's institutions of higher education fill critical roles that include both scientific breakthroughs and preparing a workforce that can thrive within and lead an economy driven by technological innovation. NJIT has been highly successful in achieving each of those goals. NJIT prepares students to become leaders in the technology dependent economy of the 21st century, and we are one of only 131 universities nationwide rated an "R1" research university by the Carnegie Classification®, which indicates the highest level of research activity.

NJIT is a launching pad for its students and serves as an anchor institution, because we prepare students and strive to collaborate with the community to prepare the future workforce and institutions from high demand fields that are at the core of what is unquestionably a technology economy. All major business organizations today are driven by new and improved technologies which bring about new products, improved product capabilities, and business process efficiencies.

Founded in 1881 by industrialists to support the workforce needs of the City of Newark, New Jersey Institute of Technology (NJIT) is one of 35 polytechnic universities in the United States and proudly embraces economic development as a core component of its four-pronged mission that also includes education, research, and community service. NJIT plays a critical role as a catalyst for innovation in New Jersey and has an annual impact on our state's economy of greater than $2.8 billion. While NJIT faculty members do conduct a great deal of externally funded basic research, we have become an innovator because we

7x

have developed an ecosystem that matches our university's resources with the needs of industrial partners. This ecosystem has several components.

The first is talent. NJIT begins its commitment to talent development in the pre-college years through a number of initiatives that build a pipeline of diverse and talented students in the science, technology, engineering, and math (STEM) disciplines. These programs are designed to enhance the pool of women and underrepresented minority students interested in STEM education. NJIT also educates approximately 12,600 highly talented students in baccalaureate through Ph.D. programs. NJIT is preparing the workforce that New Jersey needs today and for the future. Each year, the United States has millions more available STEM jobs than it has skilled workers to fill them. NJIT is our state's public polytechnic research university and its greatest source of STEM talent. We educate approximately one-third of our state's engineers and scientists, and 62% of all engineering degrees awarded to African-American and Hispanic students by New Jersey public institutions are awarded by NJIT. We also are proud to note that this Fall's first-year class is our largest and most diverse in university history.

The second component of our ecosystem is knowledge. NJIT conducts more than $163 million in research activity annually and is a major producer of intellectual property, with 166 unexpired patents, 37 pending U.S. non-provisional patent applications, 23 pending U.S. provisional patent applications, and three international applications. We are one of only three universities in New Jersey to attain R1 status from the Carnegie Classification, making us one of the most productive research universities in the nation. NJIT is a global leader in such fields as health care and medical devices, civil infrastructure, advanced manufacturing, cybersecurity, transportation, nanotechnology, clean energy, clean water, resilient design, national defense, financial services, materials science, and many other fields.

Our ecosystem's third component is infrastructure. NJIT offers state-of-the art facilities and equipment necessary for education, product design, testing, development, and production. We have executed a $500+ million campus transformation, adding over 1 million square feet of space that includes more than 90 new or renovated labs, the Makerspace at NJIT, and several academic and research facilities. This infrastructure provides thousands of students with experiential learning opportunities to enhance traditional teaching, a differentiator for our graduates and researchers.

8X

New Jersey Institute of
Technology
University Heights
Newark, NJ 07102-1982

The fourth component of our ecosystem is innovation. The New Jersey Innovation Institute (NJII), an NJIT subsidiary focused on innovation, helps turn ideas into workable solutions across four divisions: healthcare, entrepreneurship, defense and homeland security, and professional and corporate education. This is a unique platform for applying NJIT's intellectual and technological resources to challenges identified by industry partners. NJII advances the competitiveness of key industrial sectors by combining the vast resources of NJIT, other partner universities, strong industry and government relationships, its own professional staff, and proven methods for building ecosystems to help drive innovation and deliver solutions that make a direct impact on the economy and the health and welfare of its participants.

NJII is the state designated entity to manage the New Jersey Health Information Network (NJHIN) supporting state-wide healthcare interoperability in partnership with the NJDOH and NJDHS – a working success story of providing an industry solution managed by our Healthcare Division. NJII fosters entrepreneurship through VentureLink, New Jersey's oldest and largest technology business incubator, and by committing $6.75 million to fund Highlander startups. We have been recognized as the top public university in the Northeast for undergraduate entrepreneurship studies, according to The Princeton Review. Additionally, we have partnered with HAX-SOSV, which is focused on hard tech startups and is investing $50 million in the greater Newark start-up ecosystem. Our Professional and Corporate Education division provides training to keep the workforce digitally relevant and technically skilled and to serve as a source for innovation education.

The model employed by NJIT has proven successful in creating an ecosystem that accelerates the development of startup, early-stage, and scale-up companies, and it results in product creation, process improvement, job creation, and economic development in key industry sectors. We are serving a vital role as a catalyst for innovation, and I thank you for the opportunity to share our success today.

Sincerely,

Angela R. Garretson, Ph.D.
Chief External Affairs Officer

9x

Hi, I'm Aaron Price. It's an honor to be here on behalf of the NJ Chamber of Commerce in my role as the CEO of TechUnited:NJ. For those of you who do not know, we're New Jersey's trade group and nonprofit that represents entrepreneurs and innovators in New Jersey. I'm an entrepreneur from New Jersey myself, and so this topic is very near and dear to my heart.

Personally, I've been selling things to my friends since high school. Legal things, but selling things nonetheless. I started my first real tech business in 1998, which was DeliverU, one of the first online food ordering service businesses, like what you know as Grubhub or a Seamless today. And while we did very well, processing over 3,000 orders a month as college students, we lacked mentorship, guidance and investment - which is why the mission of TechUnited is so important to me. DeliverU could have been today's market leader had we been surrounded by the right resources.

Fast forward to what was kind of an isolating career on an island while my friends took a more traditional career path, I started the New Jersey Tech Meetup, which grew into the state's largest gathering of entrepreneurs, a community of more than 8,000. This community inspired me to launch the Propelify Innovation Festival - what Forbes calls the south by southwest of the Northeast, where we bring together over 8,000 entrepreneurs and innovators each year for all things entrepreneurship and technology.

Three years ago, Propelify merged with what was the New Jersey Technology Council, which we have rebranded as TechUnited:NJ. We believe the magic is in working together, in uniting the technology community. In stepping into this role a few years ago, we looked at what are some of New Jersey's strengths, industries we could own - especially since we live in the shadow of New York City - and how do we compete with one of the top three markets in the startup community. New York, Massachusetts, California take about 90% of the $200B venture dollars that get invested. The other 47 states compete for just about 10% of that pie.

We all agree on the talent opportunity here. The talent, capital, access, and incredible colleges, universities, and corporations that call NJ home. I know you all know these statistics - we are a top five location of Fortune 500 companies as well. So why are we still hanging onto the days of Bell Labs and not inventing more of the future at more scale? We're certainly doing this in pockets, but we're lacking scale.

We believe we need to lean into a few areas of focus. At TechUnited:NJ we've launched what we call our BetterX programs. We've partnered with PSEG on what we call our BetterPlanet program, which addresses how tech plays a role in climate change. If you're working anywhere in the world on that, we can accelerate your business and that relationship. We give away a cash

prize each year, having now given away over $300,000 in the last few years as a non-dilutive grant to several startups. We do the same thing with Verizon and CrossRiver Bank on what we call the BetterConnected program. If you're working in smart cities and 5G, we can accelerate your business here with those relationships. We also work with Robert Wood Johnson and LabCorp on what we call our BetterWellness program. So if you're a startup in the health and life sciences space, we can accelerate your business.

While I agree wholeheartedly - I live in New Jersey - that it's a great place to be and live and to raise a family, we need to sell the state on the business differentiation and that you can build smarter, better, faster by engaging in this community. As an entrepreneur, I would have flown anywhere in the world, and I did many times to do whatever it took to accelerate my business. We have that value proposition on our doorstep. We must collaborate the right way. I would encourage you to invest in programs like our BetterX programs to drive awareness - as came up earlier - that many of these assets exist, that we can give startups a leg up in a variety of industries, that we can inspire, train, educate and mentor young company entrepreneurs. It doesn't necessarily mean young entrepreneurs though it tends to be, but that we can give people an opportunity of how to build a business and what's authentically best in their community and skillset, providing an authentic fit for an innovator or region.

So we believe that the industry focuses where NJ can thrive are climate, life sciences, fintech, logistics - we now have the most active port in the country, in case you're unaware, and a few others. These stand out certainly as verticals where NJ can provide a leg up.

Our view is that every company is a tech company, whether one likes it or not. Whether you are purely a tech business or you are empowered by tech. We all, I believe, would agree that the future is driven by technology enablement. We are tired of seeing these things happen where New Jersey is in the bottom half or the bottom third of these inevitabilities. We do believe that the collaboration, the right funding, the right awareness can flip this model around and we could take the assets that are already here and make them a significant strength.

With that in mind, we look to programs like the Startup New York program. Certain locations in New York are tax free for startups for ten years. To make New Jersey competitive with New York, we believe we should make the entire state of New Jersey a startup zone tax free for ten years.

We currently offer, as Kathleen Coviello from the EDA mentioned earlier, a 25% angel tax credit program. It's competitive. But we believe we need to be an order of magnitude better than

what's happening to our biggest competitor, which in this case would be New York. So consider making that a 75% tax credit.
The core issue is how do we keep and inspire entrepreneurship, especially new company formation, to happen here. We do well in incentivizing the growth stage and enterprise businesses to get involved, but we're losing too many of our entrepreneurs to other markets because they see the value I talked about earlier, the ease of which it is to raise capital, hire talent, not to mention the cultural factors built into other markets make it a very challenging place for New Jersey to thrive. So we believe investing in the BetterX programs with industry focus will help us thrive to raise more awareness and mentor more young entrepreneurs. Congresswoman Bonnie Watson Coleman helped us secure a million dollars funding to grow this program. We'd love to see the state get involved with that program as well, helping incentivize further. The Evergreen Innovation Fund has been a good step in the right direction to drive corporate involvement. There is more we must do on the grassroots level through non profits to keep our entrepreneurs here.

The average age of the most successful entrepreneur is 42. The average age in New Jersey is 40. The average age in New York City is 37. So we've got a little bit of a head start in keeping those entrepreneurs who often go at that several times over to be successful here. As I mentioned before, these advancements in technology are inevitable. We hope that, together, we can help embrace them and empower the entrepreneurs and innovators in the state to make those inevitabilities happen here first.

RESEARCH & DEVELOPMENT COUNCIL OF NEW JERSEY

Assembly Science, Innovation and Technology Remarks

Research & Development Council of New Jersey
Kim Case, J.D., Executive Director
kcase@rdnj.org / 908.875.7167
November 30, 2022

Thank you Chairman Tully, Vice-Chair Carter and the rest of this esteemed committee for allowing me to be here today. My name is Kim Case and I am the Executive Director of the Research & Development Council of New Jersey. The Council is a nonprofit organization composed of industry, academic and government members from New Jersey's pharmaceutical, telecommunications and chemical industries, industries that are all vital to the State's innovation economy.

The Council's mission is to foster collaboration among leaders in industry, academia and government to drive New Jersey's innovation economy. Our group was started in 1962, led by Bell Labs, one of the world's leading research organizations. Still situated in Murray Hill in Union County in New Jersey, Nokia Bell Labs has an incredible story of innovation, dating back to the transistor, the device that all modern electronics are built off of. It also has nine Nobel Prizes under its belt. No other private sector business can compete with Bell Labs when it comes to Nobel Prizes, the leading world prize for discovery.

The predecessor to Bell Labs in New Jersey is Edison Labs, led by Thomas Alva Edison, the father of the modern day research and development method. Edison was the leader who built New Jersey's reputation for cultivating innovation and we have many metrics that illustrate our culture of innovation has stood the test of time, including the fact that New Jersey has more scientists and engineers per square mile than anywhere else in the world.

Our sheer number of STEM professionals is key to maintaining a robust innovation ecosystem. But an investment in talent development strategies is crucial: beginning in 2017 and lasting until 2027, the number of STEM jobs in NJ will grow by 9% – specifically in computing, engineering, and advanced manufacturing so an educated, STEM focused workforce is essential. Talent is critical to the start-up ecosystem, the focus of today's testimony, and for as long as the Council has been operating, it has supported initiatives that contribute to New Jersey's STEM talent pipeline.

The Council supports six STEM Learning Ecosystems in New Jersey. These ecosystems include the South Jersey STEM & Innovation Partnership located Atlantic, Camden, Cumberland, Gloucester, and Salem Counties; Delran Ecosystem in Burlington County; HSCM Ecosystem in Hunterdon, Somerset and Mercer Counties; Newark STEAM Ecosystem; Liberty Ecosystem in Hudson County; and NJ-NEST in Bergen County. Each ecosystem brings together formal and informal learning in a community or region, through the collaboration of organizations, institutions and businesses. These ecosystems are cross-sector partnerships that leverage resources to ensure high-quality STEM learning experiences are available to all: equity is key.

A few highlights from our ecosystems include the development of a cybersecurity pathway in Bergen County; HSMC and SJSIP's math and science accelerated learning K-8 programs to address pandemic-related learning loss; Delran's million dollar fabrication laboratory that serves as a

community hub for innovation learning; and Newark's Bridges to STEAM virtual career program that connects classrooms to professional speakers.

Now in its ninth year, the Governor's STEM Scholars was developed to counter New Jersey high school student outmigration. GSS recruits the state's highest achieving high school and college students and showcases the state's STEM opportunities to them. We believe that by establishing profound relationships between these students and STEM in New Jersey, we will keep these students here and secure our STEM talent pipeline and the investment we have made in their K-12 education. This year's Governor's STEM Scholars Class is our largest yet with 128 students from 20 of New Jersey's counties. We are proud that this class represents the rich diversity of New Jersey with 64% of the Scholars identifying as female and 83% as students of color.

I also couldn't be here today without mentioning that March is New Jersey STEM Month, a month-long celebration that highlights the Garden State's incredible accomplishments in science, technology, engineering, math and innovation. 2023 will mark the sixth year of New Jersey STEM Month and with this initiative we have impacted over 100,000 learners over the years.

This past fiscal cycle the Council was awarded state funding to build capacity, scale and replicate our programming so that we have an even deeper impact in the state and through New Jersey's STEM talent pipeline. We are excited to use this funding to add two new additional ecosystems in the spring, to expand the number of Governor's STEM Scholars, and to offer additional funding for more ecosystem high-quality STEM learning programs. I will share the RFP with the Chairman to share with you if you have anyone in your district interested in applying to become a STEM ecosystem.

While these programs continue to grow and thrive, we always know that more can be done. We hope to continue to receive state funding in FY24 so that we can reach more learners and continue to contribute to New Jersey's high-quality STEM talent pipeline.

If you would like to learn more about our STEM programs and how the legislature can support our work please let me know. I can connect your district to our work or develop a strategy on how you can help to start this work in your district. I'd also be happy to facilitate a tour of our member research facilities or a presentation to the committee on the research of any of our members.

I started with Bell Labs and Edison because it's hard to really know where you are going, if you don't know where you came from. The history that New Jersey enjoys because of Bell Labs and Edison is indicative of where we are today as a leader in innovation and it's important we know these stories so we can celebrate our history and know the foundation of our present. It's also important because as leaders in New Jersey we should all be proud of who we are and boast of our successes and innovation is certainly one of them.

Thank you for your time.

To: Chairman Tully and Members of the Assembly Science, Innovation and Technology Committee

From: Kyle Sullender, NJBIA Director of Economic Policy Research

Date: November 30, 2022

RE: New Jersey's Innovation Ecosystem and NJBIA's 2022 Indicators of Innovation Report

On behalf of NJBIA, the largest and most influential business association in New Jersey, we appreciate Chairman Tully and the Assembly Science, Innovation and Technology Committee for inviting us to testify on New Jersey's innovation economy, and to provide an overview of our recent Indicators of Innovation Report.

It has long been the vision of NJBIA that New Jersey reclaim its stature as the nation's predominant innovation state. Cumulatively, the United States spends more on research and development than any other country in the world – more than $657 billion in 2019 – and while this investment has a ubiquitous, positive effect on our nation's economy, we also know that states and localities have much to gain from developing an innovation ecosystem within their boundaries.

For these reasons, NJBIA has produced a series of in-depth reports which attempt to analyze the strength of New Jersey's innovation economy, with a particular emphasis on how that economy compares to our regional neighbors – given that these neighbors will be our direct competitors in attracting talent, capital, and both new and existing businesses.

As such, NJBIA released the third iteration of its "Indicators of Innovation" report series in September. Unfortunately, the results of this analysis continue to show New Jersey lagging behind our neighbors in key indicators. In several instances, New Jersey continues to be an outlier not only regionally, but on the national stage as well.

The Indicators of Innovation report is comprised of 12 indicators in three areas which I have already alluded to: capital, talent, and business. States[1] are scored in each indicator on their performance relative to the rest of the region. Because this study does not seek to determine which indicators, if any, are more important than others, these scores are not weighted.

Overall, New Jersey scored 41 points in 2022, tied for fifth in our region with Connecticut, and trailing Massachusetts (69), New York (65), Pennsylvania (51), and Maryland (45), respectively. Only Delaware scored fewer points (26).

In the interest of brevity, we have selected several key areas for concern from this analysis to share here:

- New Jersey ranks fifth in the region in Venture Capital Assets Under Management, according to the National Venture Capital Association, and was the only state to show a decline in AUM from 2010 to 2021.

[1] Includes Connecticut, Delaware, Massachusetts, Maryland, New Jersey, New York, and Pennsylvania.

- New Jersey was also the only state over the past decade to show a decline in state R&D expenditures according to the National Center for Science and Engineering Statistics. New York continues to spend more on R&D than all six other states combined, according to these estimates.

- New Jersey continues to experience a greater net loss (-27,556) of first-time degree-seeking postsecondary students than any state in the nation, according to the National Center for Education Statistics.

- New Jersey ranked last in the Tax Foundation's 2022 State Business Tax Climate index for the seventh year in a row. Three other states in the region rank in the bottom ten: Maryland (46), Connecticut (47), and New York (49). Delaware is ranked highest (16).

Our state already possesses the assets and qualities necessary to be home to successful innovation economy: a strategically advantageous, central location in the Northeast, a nation-leading K-12 education system, several highly-ranked institutions of higher education, and a highly-skilled workforce. Improving in areas where New Jersey not only trails but places as a national outlier are key to taking full advantage of these assets and improving our ability to attract the capital, talent, and businesses that we need to advance.

Finally, it is critical to highlight that this analysis contains positive news as well. The development and growth of an innovation economy will not occur overnight, and we are careful throughout this report to acknowledge that fact. Given the availability of data and statistics from a variety of sources which are used to compile this report, many of the indicators measured in this most recent analysis are several years behind – despite being the most recent figures available at the time of publication.

Furthermore, several key recommendations of NJBIA's previous Indicators of Innovation Report have been implemented in recent years (such as the reinstatement of a corporate tax incentive program; the creation of a program to increase state investment in the venture capital space; and, the generation of new public-private partnerships like the NJ Pathways to Career Opportunities Program), and it our hope that as these new policies and programs are developed and implemented, we will continue to see progress in at least some of these indicators.

As we look ahead, NJBIA has outlined a series of recommendations to grow our innovation economy:

Capital:

1. Pass A-2487/S-2707 to modify the state's R&D tax credit and bring the program more in line with those in states like Massachusetts, New York, and California.
2. Continue increasing funding to the Commission on Science, Innovation, and Technology.
3. Monitor and analyze startup generation and job creation as a result of the Innovation Evergreen Fund to ensure the success of the initiative.

Talent:

4. Continue to implement the NJ Pathways to Career Opportunities Program and identify additional opportunities to form collaborative partnerships between business, academia, and other stakeholders.

5. Allocate and administer funds to New Jersey's higher education research institutions to establish partnerships in order to retain international students and recent entrepreneur graduates.
6. Increase and annualize funding for the Innovation and Research Fellowship Program to help the state retain promising researchers in crucial industries.

Business:

7. Pass A-4161/S-1455 establishing the Government Efficiency and Regulatory Review Commission to determine where rules and regulations are creating outsized burdens on the state's businesses.
8. Continue to examine the effectiveness of New Jersey's tax incentivize programs and refine these programs as needed to ensure strategic economic development.
9. Amend New Jersey's current Angel Investor Tax Credit to provide additional incentives for investing in the state's high-growth companies.
10. Enact S-1001, A-1804, S-1445/A-3094, A-1097, S-2176, and other policies which advance efforts to reform New Jersey's structural budget challenges.

NJBIA is committed to recreating a thriving innovation ecosystem here in New Jersey. We thank you for the opportunity to submit testimony. Should you have any questions or need further information, please feel free to contact me at 609-858-9513 or ksullender@njbia.org.

Written Testimony

Hearing of the New Jersey Assembly Science, Innovation and Technology Committee
"Innovation and Start-Up Ecosystem in New Jersey"
November 30, 2022 1:00pm

Chairman Tully and Members of the Assembly Science, Innovation and Technology Committee:

Thank you for inviting me to testify today on the issue of innovation and promoting a robust startup ecosystem in New Jersey. My name is Thomas MacLellan and I am the Director of Government Affairs and Strategy for Palo Alto Networks.

By way of background, Palo Alto Networks is the world's leading cybersecurity provider. Our mission is simple: "Be the cybersecurity partner of choice, protecting our digital way of life." We have nearly 14,000 full-time employees located around the globe and protect many of the world's most sensitive networks both here and abroad including: 10 of 10 of the Fortune 10; 8 of 10 largest U.S. Banks; 9 of 10 largest manufacturing companies in the world; 9 of 10 largest utilities in the world; 7 of 10 largest oil & gas companies in the World; and 9 of 10 top U.S. hospitals.

We have been recognized as a leader in Gartner Magic Quadrant Network for Firewalls; a leader in Forrester's Zero Trust eXtended Ecosystem Platform Providers; a Leader in Gartner Magic Quadrant WAN Edge Infrastructure; a Leader in Forrester Endpoint Security Software As A Service Wave; a Leader in Forrester Zero Trust Network Access (ZTNA) New Wave; a leader in KuppingerCole Security Orchestration Automation & Response Leadership Compass; a Leader in Forrester Cloud Workload Security Wave; an Outperformer Leader in GigaOm's Attack Surface Management Radar; and we had the highest overall score in 2022 ATT@CK evaluations–100% prevention with least amount of configuration changes.

Today, we partner with the NJCCIC & other state entities in New Jersey. In addition, we work with State Higher Education Institutions such as Rutgers University and the New Jersey Institute of Technology. We are also collaborating with dozens of local government entities across the State for cybersecurity initiatives.

Innovation is key to Palo Alto Networks' success. We began as a firewall company and have evolved to offer a full-service cybersecurity platform, and we continue to up our game in preparation for what's next. Our ability to innovate and adapt is existential for us as a company—this is a must as threat actors become more sophisticated.

I want to share with you our thoughts and lessons learned regarding innovation and how New Jersey can adopt an ecosystem that is as strong as possible. Toward that end, I would like to highlight three major themes:

- Promoting a strong and diverse workforce;
- Protecting intellectual property; and

- Adopting innovative technologies in cybersecurity.

Promoting a strong and diverse workforce. Nearly all new innovations, to an extent, rely on technology. However, one of the biggest challenges facing the IT sector, and the cybersecurity sector in particular, is a shortage of qualified workers. For example, according to a recent study by ISC2, despite the fact that the global cybersecurity workforce has reached an all-time high of 4.7 million professionals, there is still a shortage of 3.4 million workers. In the US, this translates into more than 700,000 unfilled cybersecurity jobs.

Here in New Jersey, agencies like the NJOIT and NJCCIC have included cybersecurity workforce development and training in their most recent strategic plans, and the Governor has identified technology workforce investment as a priority.

We work with the NJCCIC to support and sponsor grass roots events in New Jersey like the JerseyCTF. This is a cybersecurity capture the flag event at NJIT where NJCCIC was the lead sponsor and had almost 1,500 participants from Universities worldwide.

Efforts to continue to grow and diversify the cybersecurity workforce are essential to driving and protecting innovation. This means starting in K-12 and continuing through to higher education and beyond. It also means diversifying the workforce by including more women and minorities.

At Palo Alto Networks, this belief is reflected in both our company's core values of disruption, execution, collaboration, integrity, inclusion, and in our Corporate Responsibility program. For example, our Cybersecurity Academy Program, which we provide free of charge to educational institutions, helps prepare students for successful careers in cybersecurity and address the needs of our customers around the globe. Currently, we are supporting over 1,850 Academy Programs in over 50 countries.

The Cybersecurity Academy offers a comprehensive set of courses covering cybersecurity fundamentals, cloud and network security, and operating a security operations center. All courses are aligned with the US National Initiative for Cybersecurity Education (NICE) framework for cybersecurity work roles and prepare students to be an integral part of the workforce of tomorrow.

Here in New Jersey, we currently support Cybersecurity Academy Programs at:

- Kean University
- New Jersey Institute of Technology
- Kean University
- Dean Institute and Fellowship
- Rutgers University
- Fairleigh Dickinson University
- Fairleigh Dickinson University
- Kean University

- William Paterson University
- New Jersey Institute of Technology (NJIT)
- Brookdale Community College

In addition to the Academy Program, Palo Alto Networks also funds fourteen $10,000 scholarships for students studying cybersecurity at Historically Black Colleges and Universities. These scholarships also include mentorships with current Palo Alto Networks employees. These types of opportunities are incredibly valuable to growing the workforce in a meaningful way.

New Jersey should look to scale similar efforts to make careers in these high-growth fields more attractive and attainable.

Protecting intellectual property. Doing something better, faster, cheaper, or differently is the essence of innovation and the lifeblood of start-ups. However, the scarce resources required to develop innovations are wasted if that intellectual property (IP) is stolen or compromised.

Specifically, consider the role that qualified research universities, so-called R1 universities, play in driving innovation. New Jersey's three R1 universities, New Jersey Institute of Technology, Princeton University, and Rutgers University each play a vital role in New Jersey's innovation ecosystem and protecting the research and development is absolutely critical.

However, advanced research, like all other areas of education, is evolving. Researchers are using new tools, collaborating in new ways and utilizing the cloud as their primary computing and storage technology. Traditional cybersecurity models and tools are not up to the task. This shift, along with far more remote and asynchronous research activities further exemplifies the need for a consistent, secure, and simple cybersecurity strategy.

There is also a growing need for more visibility across networks, in cloud(s), and on-premise infrastructure. Complicating issues is that "shadow IT" is harder than ever to detect and protect with so many interconnected systems. The move toward "bring your own" (BYO) devices has further complicated these issues.

Finally, integrating cybersecurity best practices, while providing an environment conducive to exploration and innovation is particularly challenging. Researchers must maintain compliance with all applicable regulations and laws in an environment that is, by its very nature, open and collaborative. Cybersecurity professionals must integrate next-generation security models like zero trust while also working as an enabler of research and not an unnecessary burden on the research function.

3. Adopting innovative practices in cybersecurity. One of the mantras in cybersecurity is that as you modernize, so do the attackers. As such, organizations need to adopt a range of cybersecurity best practices and I would like to highlight six opportunities for immediately and significantly improving the state's cybersecurity capabilities.

1. **Support the adoption of real-time attack surface management capabilities.** There is a growing recognition that attack surface management is foundational to other cybersecurity controls and best practices. An outside-in view of your attack surface catches assets and exposures you never knew existed to help with attack surface reduction. An entity that does not have an accurate, real-time understanding of what its internet-facing infrastructure looks like through the eyes of the adversary is working off an inherently incomplete and unstable cybersecurity baseline.

   Because manual asset inventory and point-in-time assessments are slow and prone to error, organizations need automated tools that can continually provide attack surface management monitoring. For example, Palo Alto Networks' Xpanse tool provides a complete, accurate and *continuously* updated inventory of all global internet-facing assets for organizations, including those in on-premise data centers and public cloud providers. Xpanse allows organizations to discover, evaluate and mitigate cyber attack surface risks in near real-time.

   It's worth noting that the U.S. Department of Defense recently adopted Xpanse to automatically identify its known and unknown internet-facing assets, prioritize them for remediation, and deploy playbooks to address critical vulnerabilities. States and local governments should have similar capabilities.

2. **Have incident response retainers in place prior to an attack.** By definition, disasters are unpredictable but that does not mean that governments can't prepare for the unexpected. One way that state and local governments can arm themselves prior to an attack is to have incident response retainers in place so that when an attack occurs they are able to reach out for help at a moment's notice.

   By way of example, earlier this year, a local government's IT system was severely crippled by a ransomware attack that had far reaching impacts across the majority of governmental services. Unfortunately, they did not have an adequate incident response plan in place, including an incident response retainer by a qualified provider, and as a result lost significant time early in the attack which allowed the attackers to further penetrate into their IT infrastructure.

   Pre-establishing incident response retainers to support state and local governments, can reduce latency in responding to an attack and help ensure that organizations can get back online as soon as possible.

3. **Support comprehensive risk assessments.** Another way governments can work together is to support risk assessment programs that help organizations understand how they rate across key domains including ransomware readiness, lifecycle security reviews and best practice assessments. Each of these are essential to helping organizations understand their individual exposure to risk.

For example, Palo Alto Networks' Unit 42 works with organizations to assess conformance with best practices and standards, such as NIST, and also to assess how prepared they are for a ransomware attack. These types of assessments can include pen and paper assessments, table top exercises and comparison of how an organization's current security stack identifies incoming threats.

4. **Establish an automated joint security operations center.** Joint security operation centers (JSOCs) are an effective way for governments to band together to share information and respond to attacks. They provide a central way to understand specific threat vectors and scale a response. Additionally, because attackers often reuse tactics, techniques, and procedures (TTPs) that have been successful in the past, JSOCs can help similarly configured governmental organizations proactively remediate weaknesses. Finally, by leveraging effective automation tools, JSOCs can help address critical staffing gaps that may impact readiness and response capabilities.

5. **Secure the remote workforce.** Perhaps one of the biggest changes the pandemic brought was the blurring of traditional work boundaries. What was once termed "remote" or "hybrid" is now just "work." Today's workforce demands immediate, uninterrupted access for users, no matter where they are located. Unfortunately, existing network approaches and technologies do not provide the levels of security and access control organizations need. Organizations that adopt a new security concept known as secure access service edge or SASE are enabling a scalable approach that can support a remote workforce with a high level of security.

   Working remotely requires a different security solution set, especially as data moves back and forth between the public cloud and an organization's internal network. This is why a Zero Trust approach to cybersecurity is so critical. Zero Trust is a cybersecurity strategy premised on the idea that no user or asset is to be implicitly trusted. It assumes that a breach has already occurred or will occur and therefore, a user should not be granted access to sensitive information by a single verification. Instead, each user, device, application and transaction must be continually verified to be able to access an organization's sensitive computing resources. This is especially important in a remote work environment where network boundaries have all but disappeared.

6. **Optimize existing technologies.** Many governmental organizations do not fully leverage the extant power of their cybersecurity capabilities. At the outset, many government security stacks are comprised of multiple point solutions that lack interoperability and do not allow for a true zero trust architecture. Effective security orchestration tools can help alleviate that weakness in the short term, but long-term solutions should look toward implementing more platform-based capabilities moving forward. A collateral benefit of such an approach would give governments the opportunity to add or turn on additional capabilities, through measures like subscriptions on existing next generation firewalls that will immediately add net-new capabilities at marginal costs.

LIBERTY SCIENCE CENTER
WHERE THE FUTURE COMES TO PLAY

222 Jersey City Boulevard, Jersey City, NJ 07305
201.200.1000
201.451.6383
LSC.org

My name is Christine Arnold-Schroeder, and I'm the Vice President of External Affairs at Liberty Science Center. First, on behalf of the LSC trustees and my fellow executives at the Center, I want to thank you for the 29 years of support that the State of New Jersey has provided LSC.

Next year, Liberty Science Center celebrates its 30th anniversary of inspiring learners of all ages about the power, promise, and pure fun of science and technology. LSC is proud to be the most visited cultural institution in the state of New Jersey with an annual attendance of more than 750,000 children and adults. The Center houses the Jennifer Chalsty Planetarium, the largest planetarium in the Western Hemisphere, and a new exhibition space, the Weston Family Art and Science Pavilion. More than 280,000 K-12 students participate annually in STEM education programs at LSC. 91,000 of these students come from the state's highest-need and lowest-income communities. LSC's mission is to inspire the next generation of scientists and engineers. During the COVID-19 pandemic, we became New Jersey's largest provider of live virtual science programming to sheltered-in-place students and teachers. Our astronomy webcasts alone drew 201,749 viewers in 2020.

LSC has embarked on a large expansion to build what will become a 30-acre innovation campus called SciTech Scity. The goal of this "Science City of Tomorrow" is to foster the creation and growth of new companies that use science and technology to make the world a better place. In the tradition of Walt Disney's original vision of EPCOT (**E**xperimental **P**rototype **C**ommunity of **T**omorrow), SciTech Scity aims to be an internationally recognized community where businesses test—and residents and visitors experience—new science-based products and services before they come to market. SciTech Scity will bring together technologists, scientists, entrepreneurs, civic leaders, citizens, teachers, students, and other thinkers and doers who share renowned computer

scientist Alan Kay's prescription that "the best way to predict the future is to invent it."

SciTech Scity will be a community infused with scientific creativity and actionable optimism about building a better future for all of us. SciTech Scity will help drive New Jersey's innovation economy and help position New Jersey and Jersey City as being on the leading edge of applied science worldwide.

The business creation hub of SciTech Scity will be an eight-story facility called Edge Works. It will have laboratories, R&D spaces, office suites, co-working spaces, and a product showcase for startup companies and for established companies and universities that want to be part of this innovation ecosystem. We will initially focus on two industry sectors: healthcare and clean tech/climate tech.

You do not need me to tell you that there is a crisis in U.S. healthcare. Costs keep escalating, outcomes have worsened, and doctors and nurses are burning out. Technology can help us get out of this crisis by shifting healthcare from hospitals into people's homes. Technology will allow people to track their own health and intervene before they get severely ill. An ounce of prevention, the old adage goes, is worth a pound of cure.

SciTech Scity's first innovation partner and international tenant is Israel's Sheba Medical Center, the largest healthcare system in the Middle East and one of the top 10 hospitals in the world. An American affiliate of Sheba will build and operate a cutting-edge "hospital of the future" simulation space at SciTech Scity employing a host of technologies that integrate sensing, monitoring, AI, augmented reality, telecommunications, and robotics. This "hospital of the future" simulation will focus on digital health and home healthcare, including "hospital in the home," and show the promise of digital

medicine to deliver better health outcomes and wellness equity. Digital advances in healthcare will help all of us, but they offer particular promise to underserved communities that don't currently have convenient or affordable access to specialized healthcare.

Sheba will *not* be treating patients at SciTech Scity, and so it will not be competing with existing hospitals and healthcare providers in New Jersey. Medical providers throughout the state are invited to join Sheba and LSC in advancing a patient-first future of healthcare. Sheba Medical Center is SciTech Scity's partner in showcasing what health and medicine will look like in the near-term future. Top-shelf innovation partners in other key industries—energy/sustainability and artificial intelligence, for example—will ensure that SciTech Scity achieves its vision of being **the premier place in the world where people can come and see the future before it is actually here.**

The SciTech Scity campus will house Liberty Science Center High School, a new public magnet STEM high school for Hudson County that will be built by the Hudson County Improvement Authority and operated by the Hudson County Schools of Technology. The new high school will provide programs in Earth (Sustainable Engineering and Climate Science), Life (Biological Sciences), and Space (Astrophysics) to 400 students in grades 9 through 12. LSC will arrange for the students to have intensive mentorships and work experiences with the companies and scientists at Edge Works, nearby Liberty State Park, at LSC itself, and at companies in the surrounding community. One unique feature of the funding model for Liberty Science Center High School is that significant *private* funds, starting with a $2.75 million matching challenge from the Overdeck Family Foundation, went to fund this *public* school.

Liberty Science Center High School will put students on a path to well-paying

STEM careers. This is particularly important in Hudson County, the most densely populated county in New Jersey, where students from low-income families are underrepresented in STEM scholastic programs and Hispanic and Black adults are underrepresented in STEM jobs. LSC will create preparatory programs for middle school students from underserved communities in Hudson County who are passionate about science and aspire to attend Liberty Science Center High School but need extra help in mathematics or other prerequisite skills.

SciTech Scity will also include Scholars Village, residential housing for innovators, teachers, scientists, entrepreneurs, STEM students, and other individuals and families who want to be part of this tech-progressive community that's inventing the future. These residents will have the opportunity to test and use transformative new high-tech products before the rest of the world.

SciTech Scity is a public-private partnership. The city of Jersey City gifted land to the project that's worth $18 million. Additionally, Liberty Science Center has lined up approximately $400 million for the project, from individual philanthropists like the honorable Frank Guarini and blue-chip companies like EY, Verizon, Bank of America, Horizon Blue Cross Blue Shield of New Jersey, and ADP. The extensive site work on the SciTech Scity land is taking place right now. Construction is expected to start early next summer once the final $40 million needed for the project is all in place. SciTech Scity is scheduled to open in 2025.

Thank you for giving me the opportunity to present SciTech Scity. I invite all of you to visit LSC. We have a great new exhibit on Pompeii and, thanks to donors John and Regina Scully, we now have one of the world's largest model train sets, which shows the Lackawanna Railroad as it was in New Jersey in 1952. Please reach out to me and we'll give you and your family a behind-the-scenes tour of LSC. Thank you.

Frank J. Guarini
Innovation Campus
SCITECH
SCITY
WHERE THE FUTURE
COMES ALIVE

27x

SCITECH SCITY
PHASE 1
LIBERTY SCIENCE CENTER
EDGE WORKS
LIBERTY SCIENCE CENTER HIGH SCHOOL
SCHOLARS VILLAGE

28x

TESTIMONY FOR
ASSEMBLY SCIENCE, INNOVATION AND TECHNOLOGY COMMITTEE

DATE: November 30, 2022

TO: Assemblyman Christopher Tully, Chair
Assemblywoman Linda Carter, Vice-Chair
Members of the Assembly Science, Innovation and Technology Committee

FROM: Debbie Hart, President & CEO, BioNJ
Ian McLaughlin, Executive Director, Government Affairs

CC: Allison Meyers, PhD, Assembly Democratic Aide
Jack Barnes, Assembly Democratic Aide
Thea Sheridan, Assembly Republican Aide

RE: Assembly Science, Innovation and Technology Committee hearing on innovation and start-up ecosystems in New Jersey

Dear Chairman Tully, Vice Chair Carter, and members of the Assembly Science, Innovation and Technology Committee,

As the trade organization for businesses and organizations in the life sciences throughout New Jersey, representing approximately 400 entities at various stages of commercialization and funding, BioNJ is grateful for the invitation to participate in this hearing focused on innovation and the start-up ecosystem throughout the State.

New Jersey has been characterized as the "medicine chest of the world", being home to one of the most vibrant communities of biomedical innovators in the country. Every stage of the biomedical innovation life cycle is represented throughout the State, from large and established companies to early-stage start-ups — as well as world-class basic science research.

There are a variety of characteristics that make New Jersey uniquely hospitable to biomedical innovation. Being among both the densest and most diverse states in the country, New Jersey offers unparalleled access to world-class academic and basic-science research, the greatest density of highly trained students preparing to enter the workforce, and access to the private sector investment required to transform an idea into a therapeutic available for Patients. Few other states are home to all of these features.

We are thrilled at the NJEDA's Evergreen Fund and hope to see continued support for the program, and we applaud the work of Chairman Tully and the Commission on Science, Innovation and Technology (CSIT) and NJEDA in supporting the growth of early-stage companies.

Opportunities such as NJCSIT's Catalyst Seed R&D Grant, Catalyst R&D Voucher, and SBIR/STTR Direct Financial Assistance programs and those of the NJEDA represent creative approaches that the State has taken to maintain New Jersey's status as a primary home of early-stage biomedical innovation — and we hope to see continued support for them.

We are also pleased to see the innovation that will emerge from the creation of The Hub, The Cove, and SciTech Scity. In pursuit of further supportive initiatives, we would welcome the opportunity for our members to engage with this Committee and the Legislature to more comprehensively articulate the primary sources of friction that inhibit R&D in the life sciences.

While our members appreciate these programs, there are several additional actions which would have a positive impact on the industry and its ability to grow in New Jersey, one being a reduction of the tax burden on companies within the life sciences and throughout the State.

In line with the broad push for achieving greater affordability throughout the State, we hope to see the surtax currently imposed on Corporation Business Tax filers sunset as it is scheduled to do at the end of 2023. An extension of this surcharge would send a negative message to this sector and the business community throughout New Jersey and will diminish investment in life sciences companies throughout the State.

In the wake of federal legislative provisions that will be implemented nationwide in the coming years, we hope that the State Legislature will avoid implementing policies that target, and would negatively impact, the State's life sciences ecosystem. In particular, legislation currently being considered would require advance notification prior to the introduction of new therapeutics. This will not have any impact on Patient affordability and has the potential to delay the launch of new treatments on which Patients rely. We would appreciate the opportunity to have a continued dialogue focused on Patient affordability.

Finally, BioNJ has launched a Health Equity in Clinical Trials Initiative, through which we hope to make meaningful progress towards achieving greater equity in access to clinical trials conducted throughout the State. Given its density and diversity, New Jersey offers a unique opportunity to address underrepresentation among communities who benefit from the latest biomedical innovations, and we look forward to partnering with entities throughout the State in pursuit of this goal.

Once again, thank you for the opportunity to participate in this discussion today. We look forward to continuing to work with you to further ensure that New Jersey remains the home of innovation in the life sciences.

Sincerely,

Debbie Hart
President & CEO
BioNJ

Ian McLaughlin
Executive Director, Government Affairs
BioNJ

30x

Fred M. Brody
Brody Business Development
228 Cold Indian Springs Road
Ocean, New Jersey 07712

November 30, 2022

Hon. P. Christopher Tully, Chairman
Assembly Science, Innovation and
Technology Committee
New Jersey State Legislature
State House Annex
P.O. Box 068
Trenton, New Jersey 08625-0068

Dear Chairman Tully:

I would like to thank you for this opportunity to appear before the Assembly Science, Innovation and Technology Committee to provide testimony to aid the development of a robust and inclusive innovation and start-up ecosystem(s).

I respectfully ask that the Committee accept this letter, and the attached document prepared by Glenn Gladney, founder of AON (Access Optical Networks, Inc.), a minority-owned technology and manufacturing start-up with primary operations in New Jersey. AON has plans (as outlined in the attachment) to establish new facilities and employment within an Opportunity Zone in Newark, New Jersey. A brief description of the founder's expertise as well my own is included in the attachment.

I am accompanied by Joseph Montemarano, who served on the staff of the original New Jersey Commission on Science and Technology for nearly a decade as Associate Director for Science and Technology, and Director for New Technology Business Enterprise. Subsequently, he joined Princeton University as its first Industrial Liaison for the NJCST-sponsored Advanced Technology Center for Photonics and Optoelectronic Materials (ATC-POEM) and various other positions and responsibilities at the interface of academic and external research, innovation and technology commercialization. He concluded his 25 years of service in 2019 at Princeton as Director for Innovation and External Alliances at the Princeton Institute for the Science and Technology of Materials. A brief description of his expertise is included in the attachment. I would like to highlight his relevant service recognitions by the New Jersey Small Business Development Center in 1994, a New Jersey Senate Resolution for dedicated service to NJ's Biotechnology Industry in 1995, and a Princeton University President's Award for Outstanding Service in 2012.

I am here today to share my business development experience as AON's Consulting Director for Government Affairs. I have had an association with AON almost since its founding as an NJ Technology start-up around 2002. I am the Founder and President of Brody Business Development (BBD), a certified Small Business Enterprise (SBE) offering governmental affairs, strategic marketing, and sales consulting services since 1999. My firm offers our clients decades of personal experience in building and fostering dynamic relationships in the public and private sectors.

Before starting BBD, I was Executive Vice President/Partner of Daybreak Express Inc., a New Jersey based niche trucking company handling time critical delivery of freight nationwide. As Director of Marketing and Sales, I helped grow the company into a $20 million transportation powerhouse, employing over 100 people.

AON founder, Glenn Gladney credits the Science and Technology Commission's university research infrastructure investments for the warm welcome he received at Princeton University, and for ease of access to key faculty research collaborations that contributed to the core of AON's technologies. In fact, one of the most important legacies of the original NJCST is its innovation capacity building and influence on the culture of NJ Research Universities.

It is important to emphasize that there is no one-size-fits-all ecosystem for NJ's sectors. One beacon of progress is NJ's life science/biotech ecosystem, which a great deal of credit for ground-breaking start-up friendly NJ legislation is owed to BioNJ (e.g., Start-up Net Operating Loss, NOL, credits). Some of NJ's other technology ecosystems, especially for infrastructure intensive hardware and manufacturing are less than optimal.

We are glad to know that your Committee understands the importance of developing a strategic Innovation and Investment Roadmap tailored to each of NJ's respective start-up ecosystems. It may also be useful to consider emulating successful economic development incentives offered by other States. For example, our closest neighboring State, Pennsylvania, has used its Ben Franklin Fund for decades to successfully entice promising NJ start-ups to leave our State. The former NJCST effort to provide a similar incentive program was thwarted by its legal structure that did not permit it to recover more than its award from successful investments, and to compound this limitation, whatever funding it could recover was returned to NJ's General Treasury rather than remain with Commission.

The New Jersey Commission on Science, Innovation and Technology should be a key player in assisting the Committee in the development of this roadmap, along with NJ's relevant public and private-sector partners and organizations. NJCSIT's resources need to be augmented and adequately staffed for this undertaking and for implementing its mission.

I invite the Committee to consider the needs and experiences of AON as a technology and manufacturing start-up, as well as many other NJ start-ups, that have found conventional Venture Capital funding to be a mis-match. Also, some of NJEDA financial assistance programs should better align to meet the Innovation Ecosystem needs. As an example, despite the significant technical and equipment investments AON has made over the past 20 years in NJ, and the several millions of dollars raised through 'friends and family' stock investment, AON has spent endless hours on NJEDA applications and paperwork without receiving a 'dime' from this entity.

I thank you for your time and attention. Mr. Montemarano and I will be happy to respond to the Committee's questions today or in the future.

Respectfully yours,

Fred M. Brody

Attachment: Access Optical Network, Inc. Testimony
Assembly Science, Innovation and Technology Committee
November 30, 2022

Independent Colleges and Universities of New Jersey

Explore the exciting college options

LIVE. LEARN. SUCCEED.
N NEW JERSEY
The Education State

New Jersey ICUNJ Education State

NJCOLLEGES.ORG

Independent Colleges and Universities in New Jersey

Bloomfield College
Caldwell University
Centenary University
Drew University
Fairleigh Dickinson University
Felician University
Monmouth University
Princeton University
Rider University
Saint Elizabeth University
Saint Peter's University
Seton Hall University

33x


New Jersey's Private Colleges
DELAWARE WATER GAP
MOUNTAINS
CENTENARY UNIVERSITY
Saint Elizabeth University
CALDWELL UNIVERSITY
Felician UNIVERSITY
NEW YORK
FAIRLEIGH DICKINSON UNIVERSITY
BLOOMFIELD COLLEGE
STEVENS INSTITUTE of TECHNOLOGY
DREW
SETON HALL UNIVERSITY
SaintPeter's UNIVERSITY
FARMLANDS
HISTORIC SITES
PRINCETON UNIVERSITY
RIDER UNIVERSITY
MONMOUTH UNIVERSITY
JERSEY SHORE
PHILADELPHIA
GEORGIAN COURT UNIVERSITY
UNJ EDUCATIONAL IMPACT
12:1
Faculty:Student Ratio
$1.1 billion
Institutional aid
95%
Students receiving financial assistance

34x

LIVE.

New Jersey is the best place to live in the nation, according to a recent WalletHub survey.

New Jersey: Best Place to Live in the US

WalletHub

There are all kinds of reasons:

A great location, offering both the beauty of the mountains and the sandy beaches of the Jersey Shore. From any of the independent colleges, it is a short commute to the metropolitan centers of New York and Philadelphia. Students can find among our colleges the benefits of small towns or the energy of urban living.

Plenty of job opportunities with 15 Fortune 500 companies headquartered in New Jersey along with state and regional businesses representing a wealth of industries.

Competitive salaries demonstrated by New Jersey consistently ranking among the top five states for earnings.

And, of course, **the nation's top educational system**.

When students go to college in New Jersey, they are more likely to remain in state after graduating to start a career and raise a family. This highly trained workforce brings big benefits to our state's economy in attracting new businesses, generating tax revenues and enriching cultural, entertainment and athletic offerings.

ICUNJ is proud to support a strong system of independent colleges and universities to meet the needs of a richly diverse student population. The partnerships we have formed with New Jersey businesses and benefactors—who provide scholarships, internships and career opportunities—will continue to contribute to the rich economic and cultural landscape in our state.

35x

LEARN.

s official—New Jersey is the #1 state in the nation to get an education. A big reason is the credible network of schools, colleges and universities that call the Garden State home.

the Independent Colleges and Universities of New Jersey, we're proud of the outstanding ucational opportunities provided by our 14 member institutions. Through the generosity donors, we provide significant scholarships—based on academic success and need—to pport the college aspirations of a diverse group of students.

ew Jersey ranked #1 in
ne nation for education by

U.S.News & WORLD REPORT *2020-2021

udents seek a degree for a variety of asons—some want to change their conomic position while others want change the world. All students want pursue their interests and academic oices. They can find their chosen area of udy among our member institutions.

ey will also find smaller class sizes, hich help students excel. Among New rsey's 27 four-year institutions, our embers consistently rank highly for their wer student faculty ratios. In fact, the 12 chools with the lowest student to faculty tios among those 27 institutions are all UNJ schools!

The proven benefits of smaller class sizes:

- Coursework can be adapted to fit class.
- Assignments are more hands-on and engaging.
- Student participation is sought and encouraged.
- Students receive more instructor feedback.
- There are more opportunities to learn from peers.

Independent Colleges and Universities of New Jersey

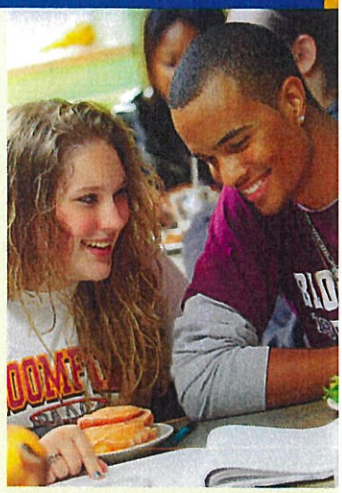
NJCOLLEGES.ORG

36x

Access

High school students need to explore the opportunities for higher education available to them in New Jersey. The goal of the independent colleges is to extend the many benefits of higher education to people from all walks of life. Each independent college sets itself apart with a diverse offering of academics, clubs, sports, arts and service opportunities.

Students now have more flexibility in accessing academic opportunities via online learning and through the introduction of new technologies. Educational equity remains a priority at all the independent colleges.



Affordability

Making a change in economic mobility, commitment and interest in a subject, and fulfilling a dream, all provide the impetus for pursuing college, but these factors alone cannot afford a student a college degree. **Over 95% of New Jersey's independent college students rely on some form of financial aid**—scholarships, grants, loans and work study—to meet the cost of higher education.

Looking beyond the listed tuition and fees to determine the actual cost to attend college is a step every student must undertake. ICUNJ and its member institutions believe that every student should have a choice in the college they attend to attain the best fit. **Last year our schools invested over $1.1 billion in their students through institutional grants in support of student choice to attend a private college.**

To learn more about going to college in New Jersey and financial options to address expenses, please visit the Higher Education Student Assistance Authority (HESAA) at hesaa.org and access the latest resource brochure at https://www.hesaa.org/Documents/GTCNJ.pdf.

37x

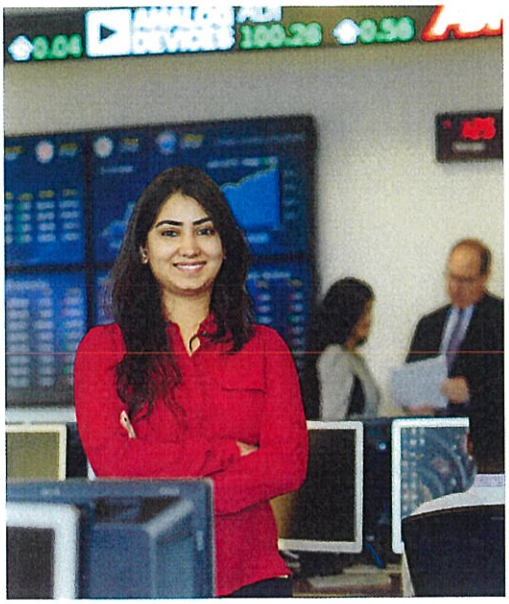
SUCCEED.

New Jersey has the highest average income among all 50 US states, according to World Population Review. A key reason: High educational attainment and 4-year graduation rates of our state's students which are both ranked among the top 5 in the US by US News and World Reports.

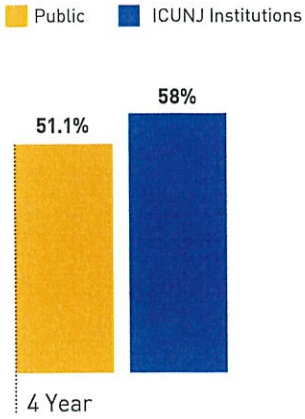
Yet, the greatest success independent college graduates achieve goes beyond individual income. With superior analytical reasoning skills and a strong ethical foundation, ICUNJ graduates make a transformative impact on our state's economy. They are the scientists, physicians, nurses, teachers, business professionals and more who are meeting emerging market needs and continuing to position New Jersey as the best place to advance your career.

With the majority of independent college alumni continuing to reside in New Jersey, our graduates are also contributing to the social, artistic and intellectual fabric of the state's communities.

The majority of students at New Jersey's private colleges achieve success earlier by completing their degrees in four years. As of 2020-21, only 41% of American college students graduated from college in four years. Finishing an undergraduate degree in four years saves students funds and decreases debt. By finishing in four years, graduates can take advantage of job opportunities, enter the workforce sooner and begin to earn a salary.



Graduation rates for first-time, full-time, degree-seeking students in BA programs (2015-2021)



38x

Fostering Diversity and Prosperity

Growing up in Irvington, NJ, cousins Clerson Xavier and Jefferson Jean-Paul were painfully aware that opportunities for college and career could be limited. Xavier once noted, "We come from a high school where people don't expect much from the students."

Thanks to financial assistance, ICUNJ scholarships and great mentors, today they know that New Jersey is the perfect place to get a great education and start a successful career. Graduates of Centenary University—an ICUNJ member institution—Xavier and Jean-Paul excelled as undergraduates. Recognizing their potential, mentors at Centenary connected them with internships, as well as opportunities to conduct environmental and medical research. In fact, they were among a group of four Centenary students to place among the top 10 in an international research competition in Texas, besting more than 750 entries from research powerhouses including Harvard, Yale, Cornell, Stanford and Johns Hopkins.

A year after receiving their degrees from Centenary, the pair are earning great salaries working at a research lab while they prepare their applications to medical school. Jean-Paul said, "When I was a freshman, I never envisioned having a paid internship, doing research in Florida or traveling to Texas to present my own independent research. I just never thought things like that were possible. Centenary has a lot of opportunities to do different things. It's a very supportive and motivating university."

These are just two incredible students among many at ICUNJ's 14 member institutions.

From left, Jefferson Jean-Paul of Irvington, Aakash Shah, M.D., White House Fellow at the US Department of Health and Human Services, and Clerson Xavier of Irvington.

New Jersey ICUNJ Education State

About ICUNJ

The Independent Colleges and Universities of New Jersey (ICUNJ) represents a diverse set of private, nonprofit higher education institutions and the students who choose independent higher education as an opportunity for educational equity, career possibilities and economic mobility. We accomplish our mission of promoting access, affordability and student success through research, government liaison, innovative programs investment, grant development, scholarships fundraising, public relations and professional development.

39x

Member Institutions of the Independent Colleges and Universities of New Jersey

Bloomfield College
467 Franklin Street
Bloomfield, NJ 07003
(973) 748-9000
www.bloomfield.edu

Caldwell University
120 Bloomfield Avenue
Caldwell, NJ 07006-6195
(973) 618-3000
www.caldwell.edu

Centenary University
400 Jefferson Street
Hackettstown, NJ 07840
(908) 852-1400
www.centenaryuniversity.edu

Drew University
36 Madison Avenue
Madison, NJ 07940
(973) 408-3000
www.drew.edu

Fairleigh Dickinson University
1000 River Road
Teaneck, NJ 07666
(201) 692-2000
www.fdu.edu

Felician University
262 South Main Street
Lodi, NJ 07644
(201) 559-6000
www.felician.edu

Georgian Court University
900 Lakewood Avenue
Lakewood, NJ 08701-2697
(732) 987-2200
www.georgian.edu

Monmouth University
400 Cedar Avenue
West Long Branch, NJ 07764
(732) 571-3400
www.monmouth.edu

Princeton University
One Nassau Hall
Princeton, NJ 08544
(609) 258-3000
www.princeton.edu

Rider University
2083 Lawrenceville Road
Lawrenceville, NJ 08648
(609) 896-5000
www.rider.edu

Saint Elizabeth University
2 Convent Road
Morristown, NJ 07960-6989
(973) 290-4000
www.cse.edu

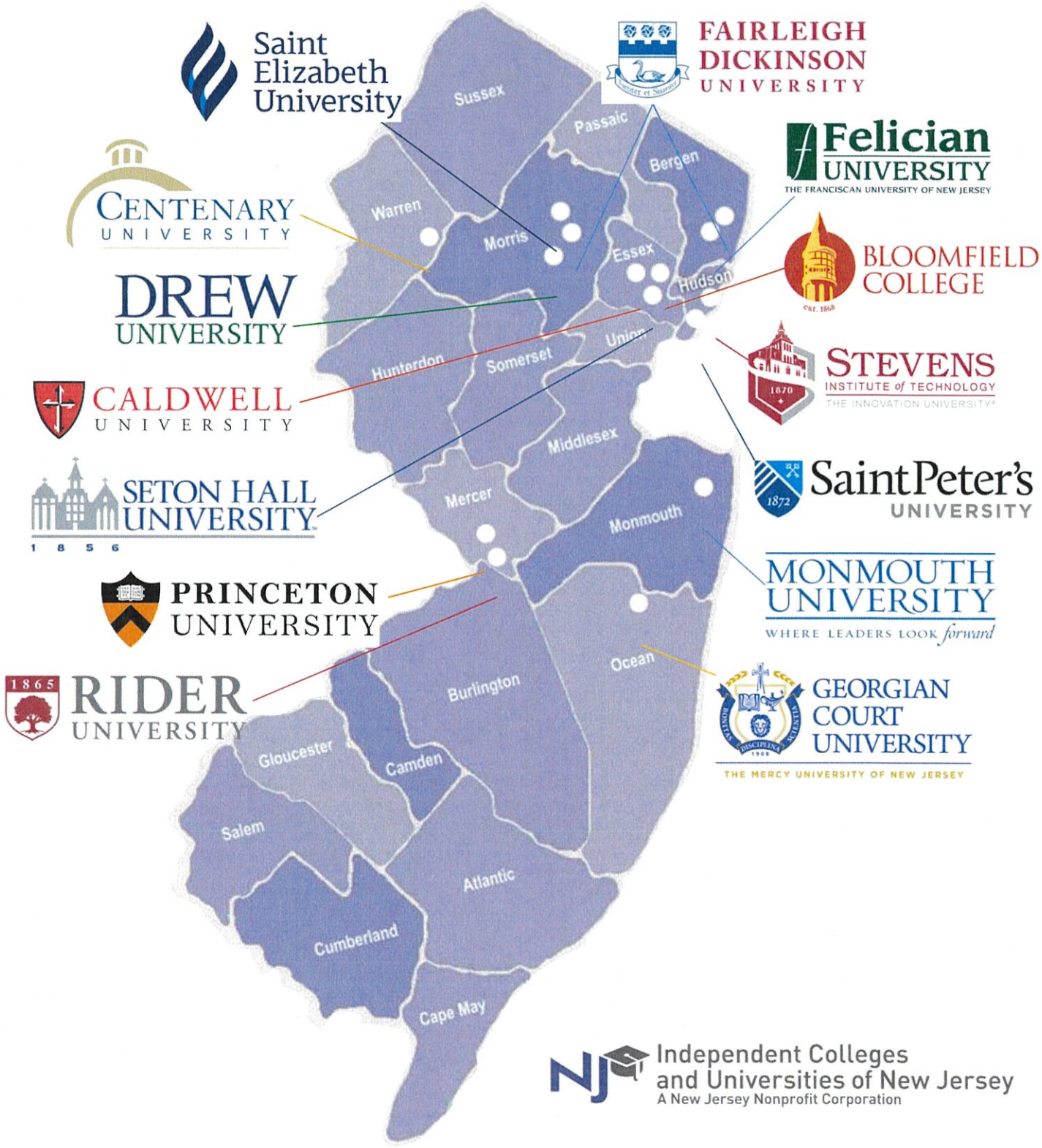
Saint Peter's University
2641 John F. Kennedy Boulevard
Jersey City, NJ 07306
(201) 761-6000
www.saintpeters.edu

Seton Hall University
400 South Orange Avenue
South Orange, NJ 07079
(973) 761-9000
www.shu.edu

Stevens Institute of Technology
Castle Point on Hudson
Hoboken, NJ 07030
(201) 216-5000
www.stevens.edu

40x

INDEPENDENT COLLEGES AND UNIVERSITIES OF NEW JERSEY



41x

Independent Colleges and Universities of New Jersey

A New Jersey Nonprofit Corporation

The 14 independent colleges and universities in New Jersey have a long history of meeting the needs of the State.

New Jersey's Independent Colleges & Universities

Bloomfield College

Caldwell University

Centenary University

Drew University

Fairleigh Dickinson University

Felician University

Georgian Court University

Monmouth University

Princeton University

Rider University

Saint Elizabeth University

Saint Peter's University

Seton Hall University

Stevens Institute of Technology

R. David Rousseau
Vice President

142 West State Street
Trenton, NJ 08608

609-218-5026

rdrousseau@njcolleges.org

www.njcolleges.org

Enabling Student Success

- Our member institutions enrolled nearly 63,000 in Fall 2021 providing opportunities for students to find the right academic, cultural, and social blend to enhance individual learning.
- We enroll nearly one-quarter of all students attending four-year institutions in New Jersey.
- The overall minority enrollment at our member institutions is 36%, with the undergraduate minority enrollment even greater at 41%.
- Our colleges and universities provide over $1 billion in institutional grant aid to undergraduate students which resulted in over 15% of independent college students in NJ paying NOTHING and another 27% will pay less than $10,000 in tuition and mandatory fees in 2018-19 due to federal, state and the institutional aid we provide to them.

Meeting the Workforce Demand

- While enrolling 17% of all higher-education students, New Jersey's independent colleges awarded 19% of all degrees conferred in FY2021.
- Our students earned 22% of the baccalaureate degrees and 34% of all advanced degrees conferred in FY2021.
- Our students earned 27% of all the education degrees and 28% of all advanced education degrees conferred by four-year institutions in FY2021.
- New Jersey's independent colleges excel in degrees awarded by four-year institutions in the fields of Science and Technology:

37% of all math degrees

31% of all nursing degrees

35% of all engineering degrees

66% of all physical science advanced degrees

43% of all chemistry degrees

37% of all computer science advanced degrees

New Jersey's Investment in Independent Higher Education

- The Tuition Aid Grant (TAG) and Educational Opportunity Fund (EOF) programs totaled $100 million in financial aid for nearly 10,000 New Jersey students attending an independent college or university in New Jersey (FY2021).
- Direct state support for operating aid in FY2023 is $10.5 million which is an increase from the $7 million provided in FY 2022 but is still less than half of the FY 2010 amount of $17.5 million. Full funding of the formula would provide approximately $28 million.

Contributions to the State of New Jersey

- The economic impact of the sector on the State of New Jersey is over $4 billion; a return of 30 to 1 on the state investment.
- New Jersey's independent colleges and universities directly employ more than 20,000 people plus more thru contractors for food service, bookstores, etc.
- The fourteen institutions collectively have more than 600,000 living alumni. About half of all graduates of these institutions still live in New Jersey.
- Our 14 member institutions will spend nearly $2 billion on new construction and renovation of campus facilities. These projects will generate many jobs in construction and related industries over the next several years.

42x

Independent Colleges and Universities of New Jersey
A New Jersey Nonprofit Corporation

4 3x

ICUNJ

Background Information

ICUNJ's 14 non-profit, independent colleges and universities are an important, strategic asset within the State's higher education system

- Provide fourteen additional options for students to CHOOSE college or university setting that best fits their needs – size, location, culture, program offerings, etc.
- Offer additional opportunities for students to continue education in New Jersey rather than leaving
- Serve diverse racial, ethnic and economic populations that match public sector and state's diverse demographics
- Provide high quality undergraduate and graduate education in wide variety of disciplines to meet workforce demands

ICUNJ's 14 non-profit, independent colleges and universities are an important, strategic asset within the State's higher education system

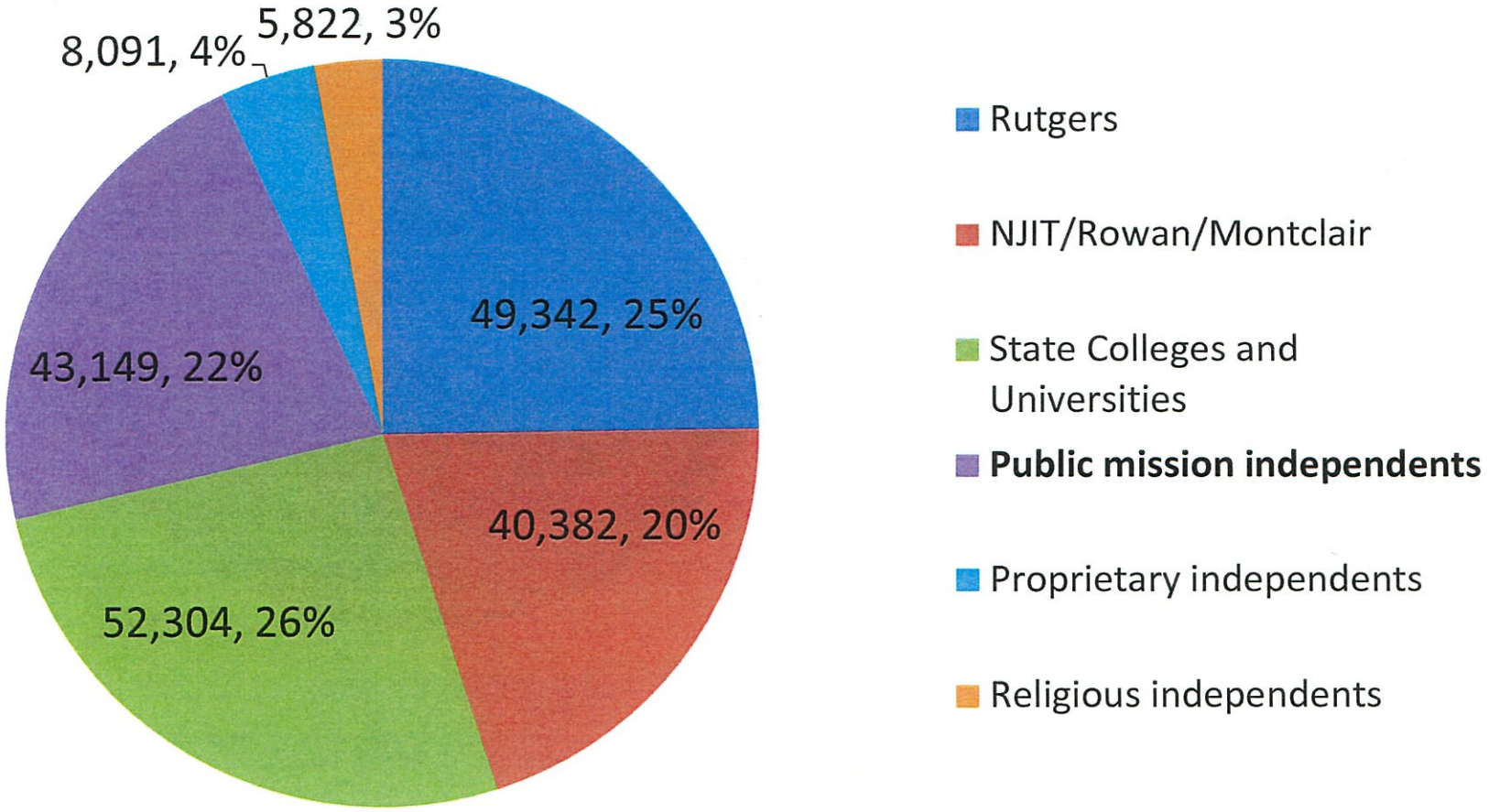
- Provide opportunities for valuable and important research that will help support the State's economic growth
- Attract out-of-state and international students to offset out-migration
- Results with limited taxpayer funding – approximately $130 million with 90% directly to students
- Economic impact of between $4 billion and $4.5 billion– $27 or $30 to $1 return on state investment

X 94

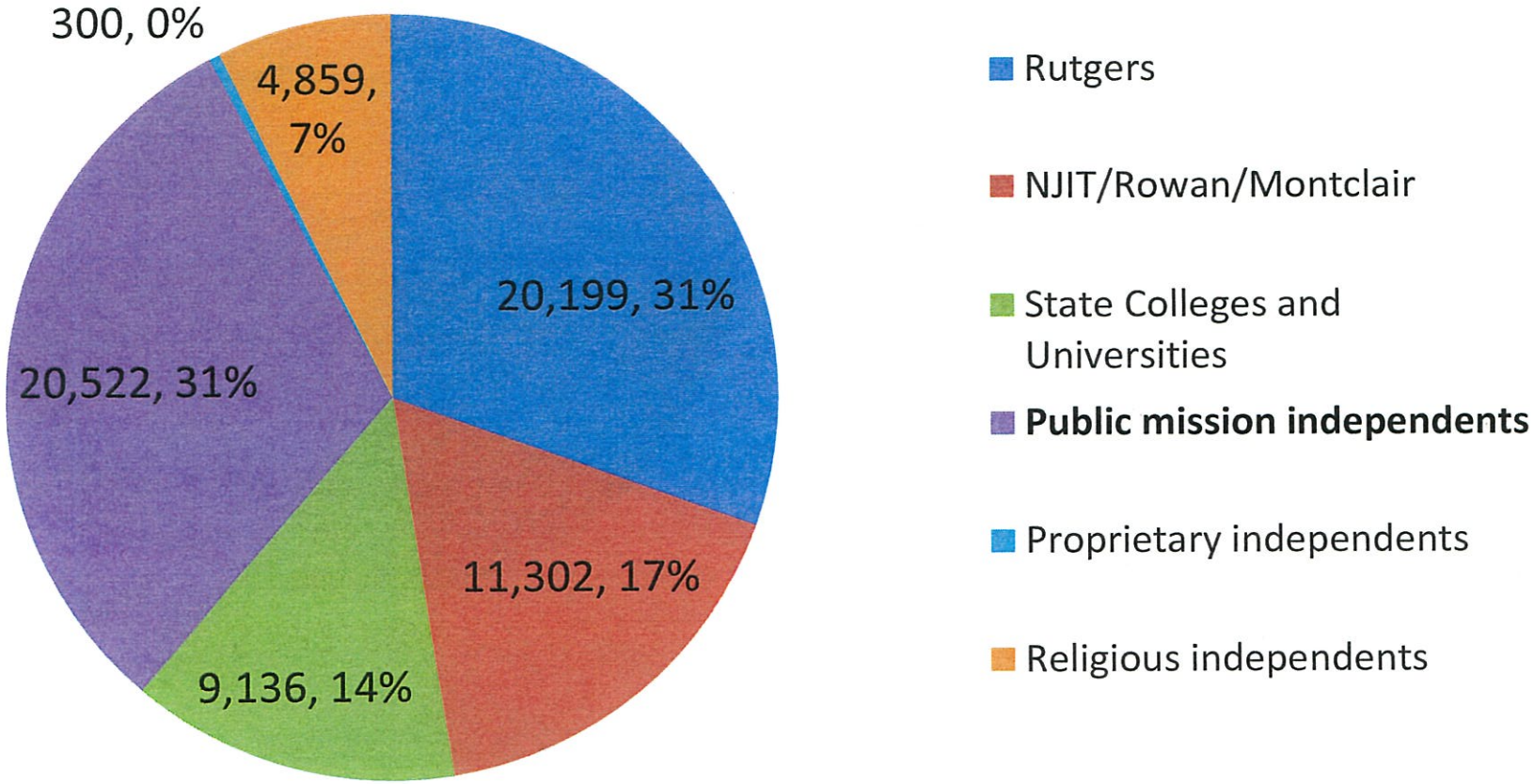
Importance of independent colleges and universities highlighted in 2010 "Kean Commission" report

- "Overall, the independent colleges and universities **expand the diversity and choice** afforded to New Jersey's college students, and they have done so for a long time."
- "New Jersey's independent colleges and universities **serve an important public purpose**. They annually award almost as many baccalaureate degrees and advance degrees – master's, professional, and doctorate – as New Jersey's three public research institutions."

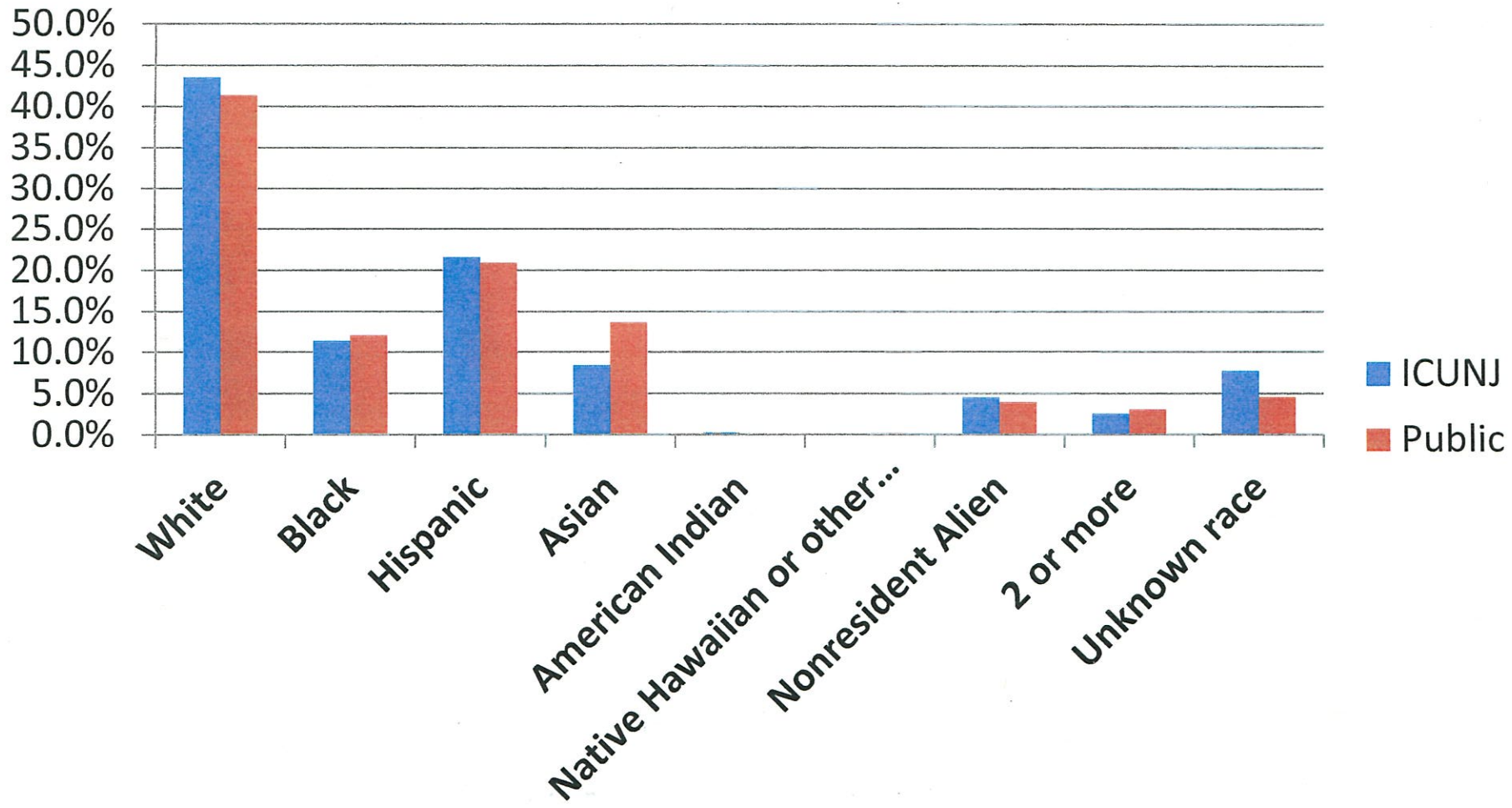
Over one in five of four year undergraduate students attend non-profit public mission independent colleges and universities Fall 2021



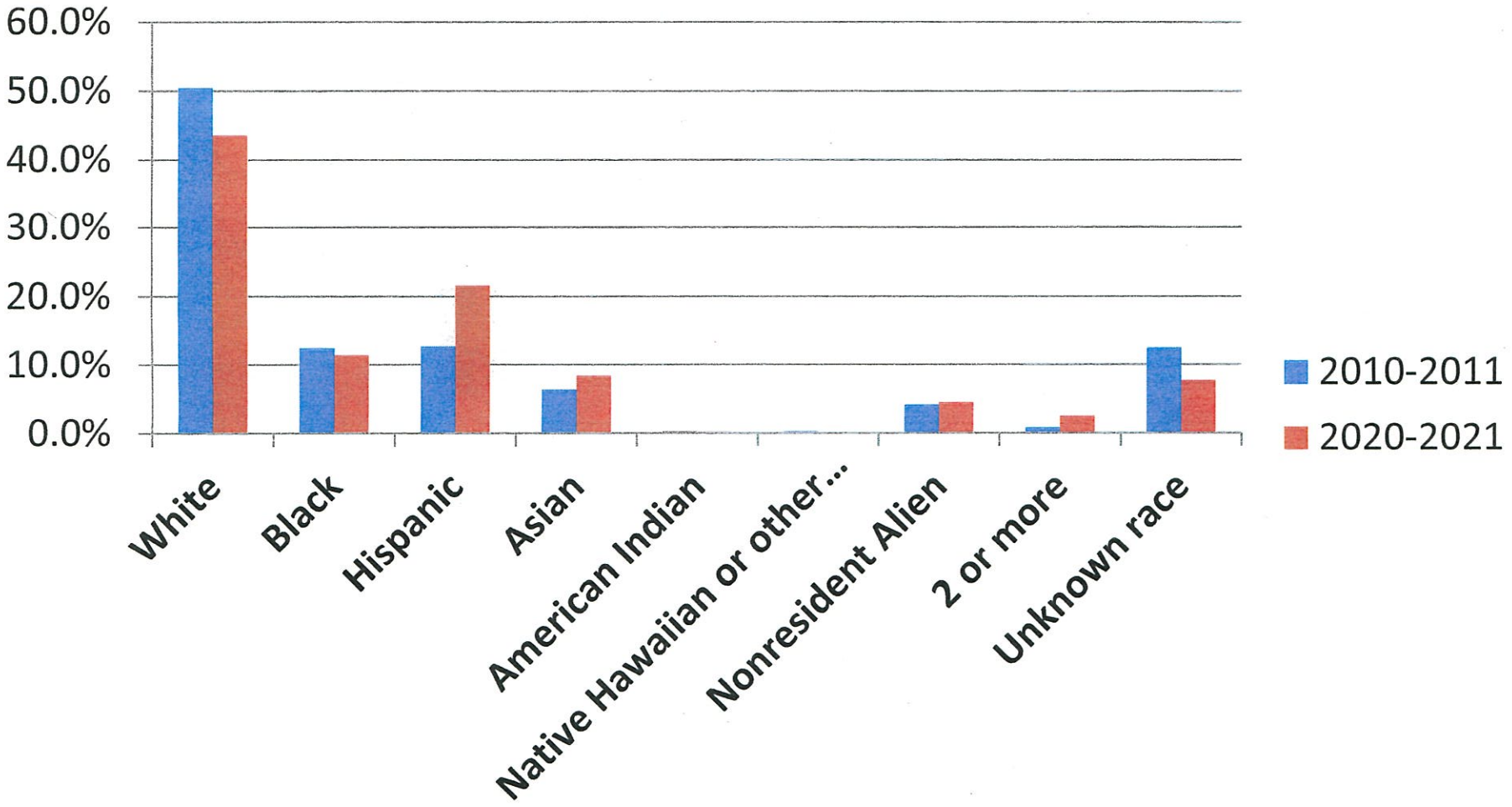
Nearly one-third of graduate and professional students attend independent colleges and universities
Fall 2021



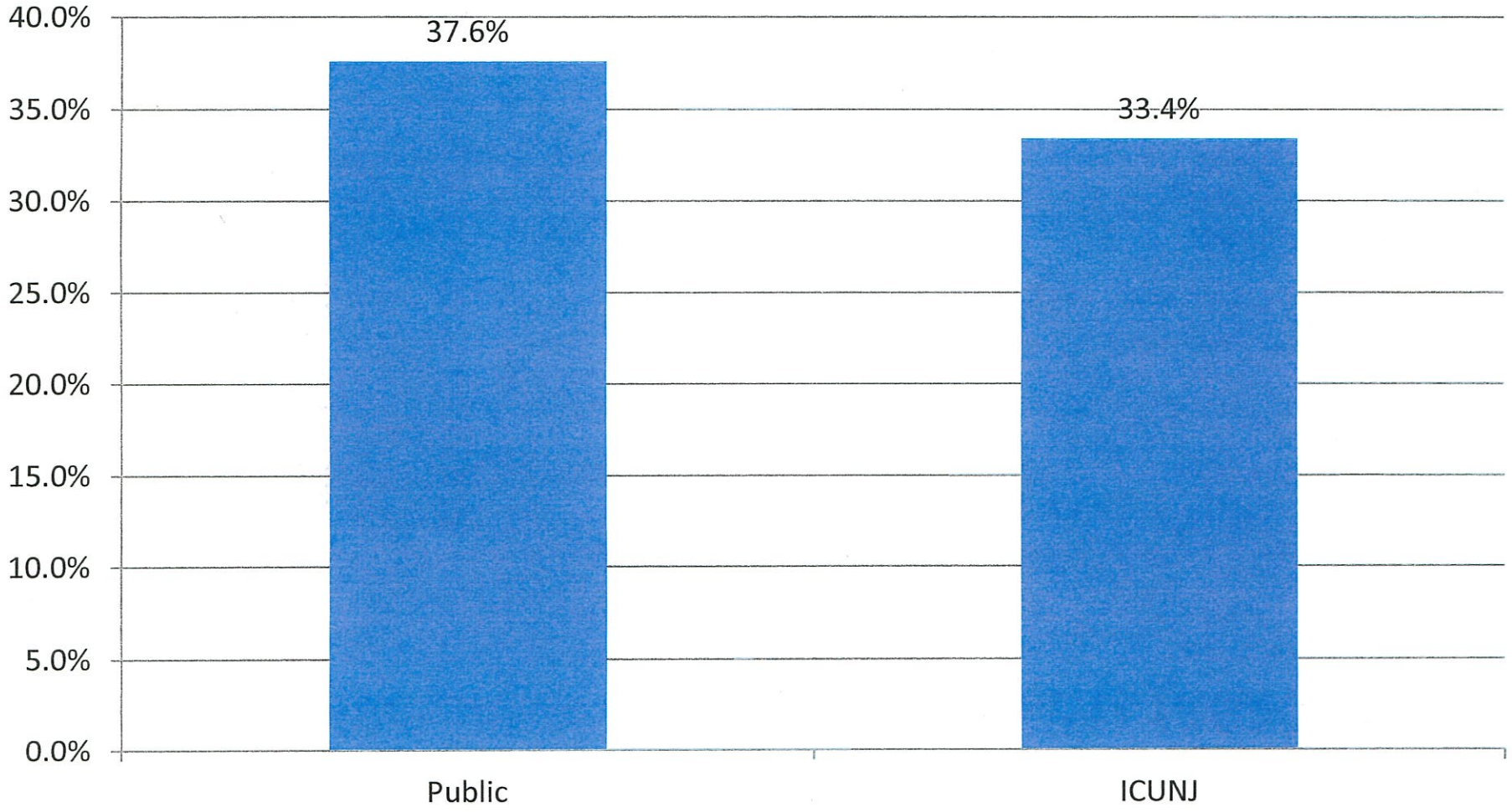
Diversity in undergraduate enrollment at independent colleges is similar to public colleges (2020 - 2021)



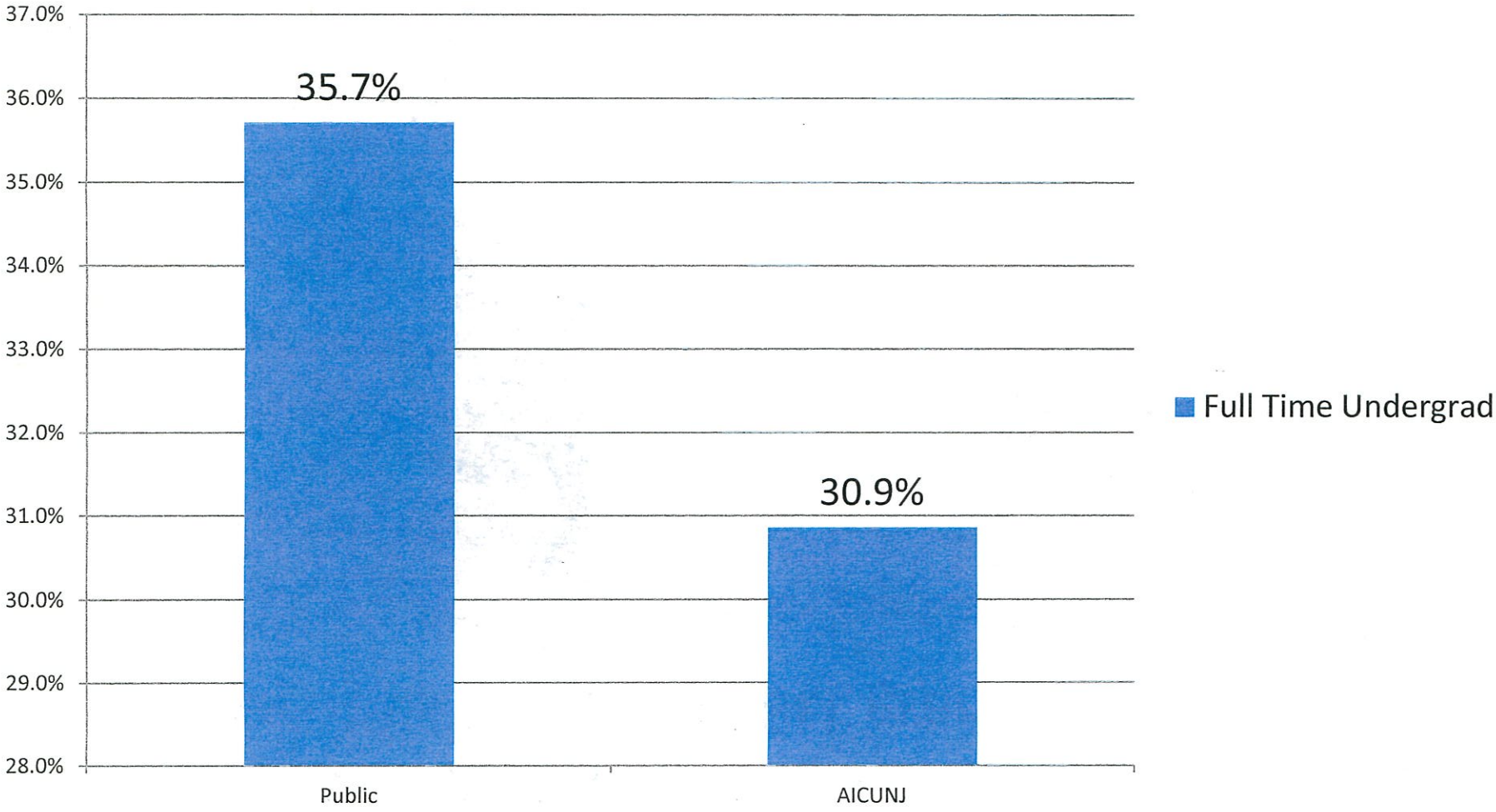
Diversity in undergraduate enrollment at independent colleges has shifted from 2010-2011 to 2020-2021



Independent colleges and universities serve similar low-income population as senior public colleges and universities – federal PELL grants (2020-2021)

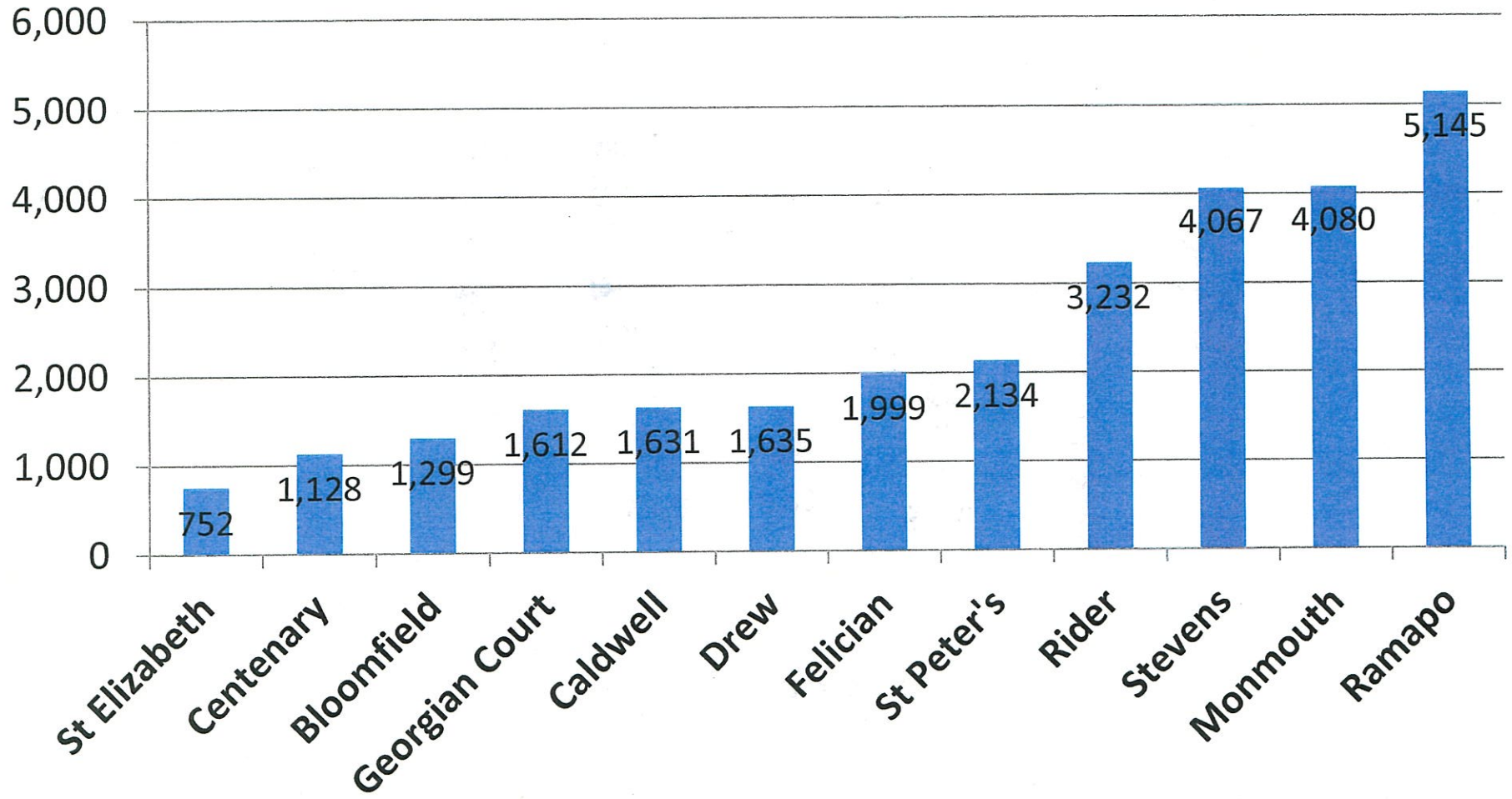


Independent colleges and universities serve similar low-income populations as senior public colleges and universities – State TAG grants (2020-21)

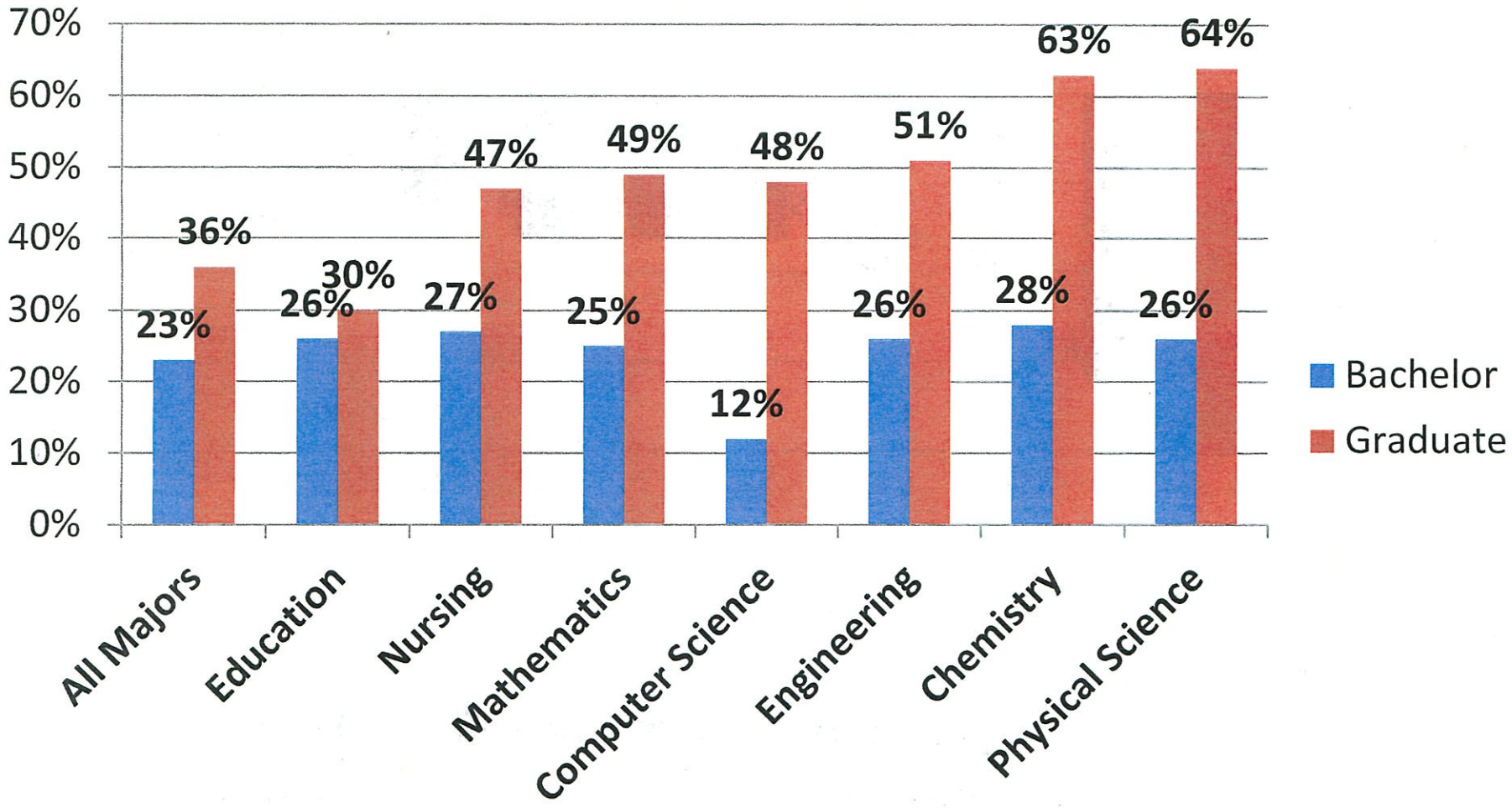


x29

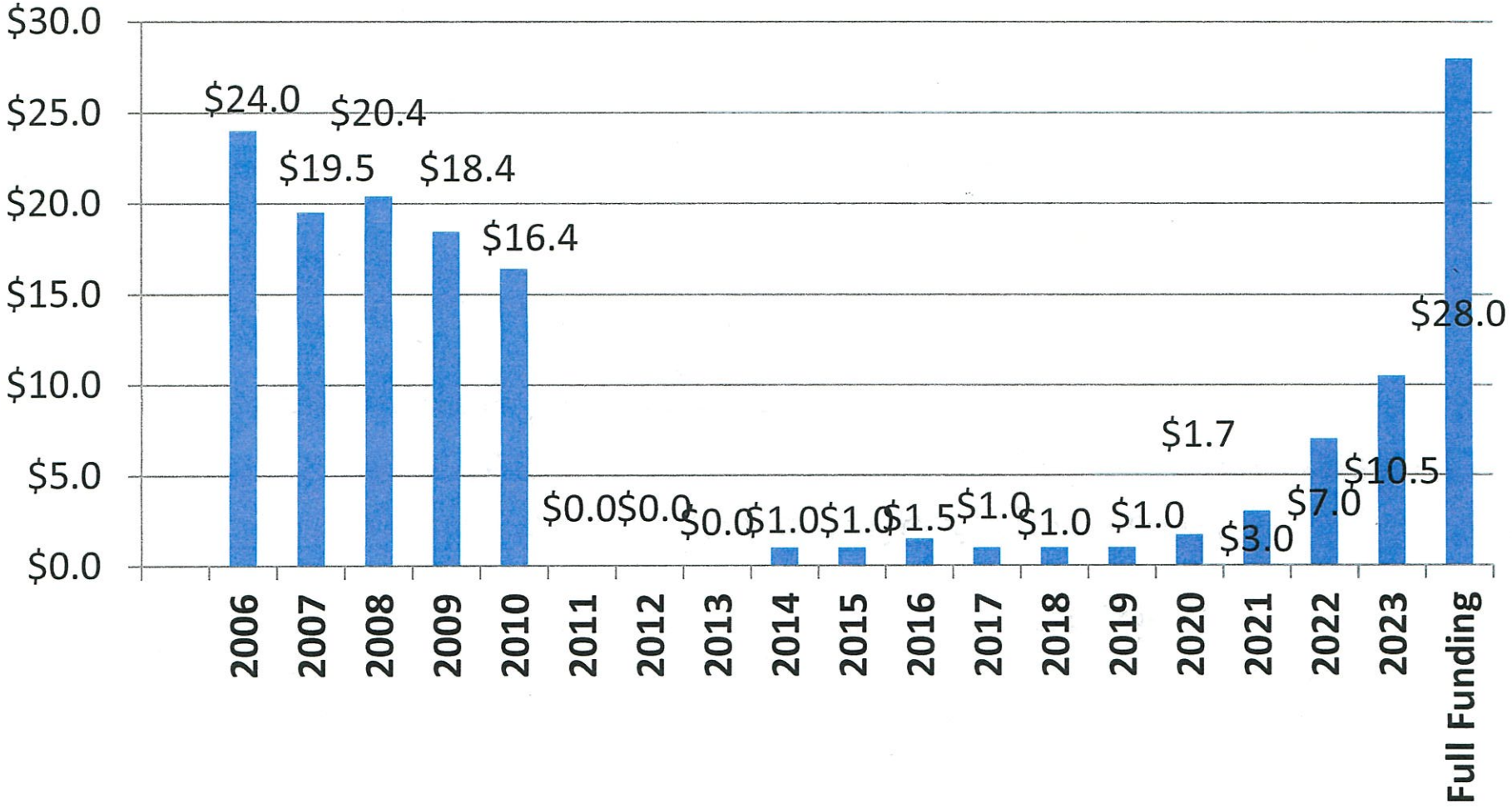
Eleven independent colleges and universities have smaller undergraduate enrollment than the smallest state college or university – eight are less than half the size (Fall 2021)



Independent college and university graduates are helping to meet NJ's workforce demand of 21st century (2018 graduates)



Direct state operating support less than half of FY 2008 levels while costs have risen

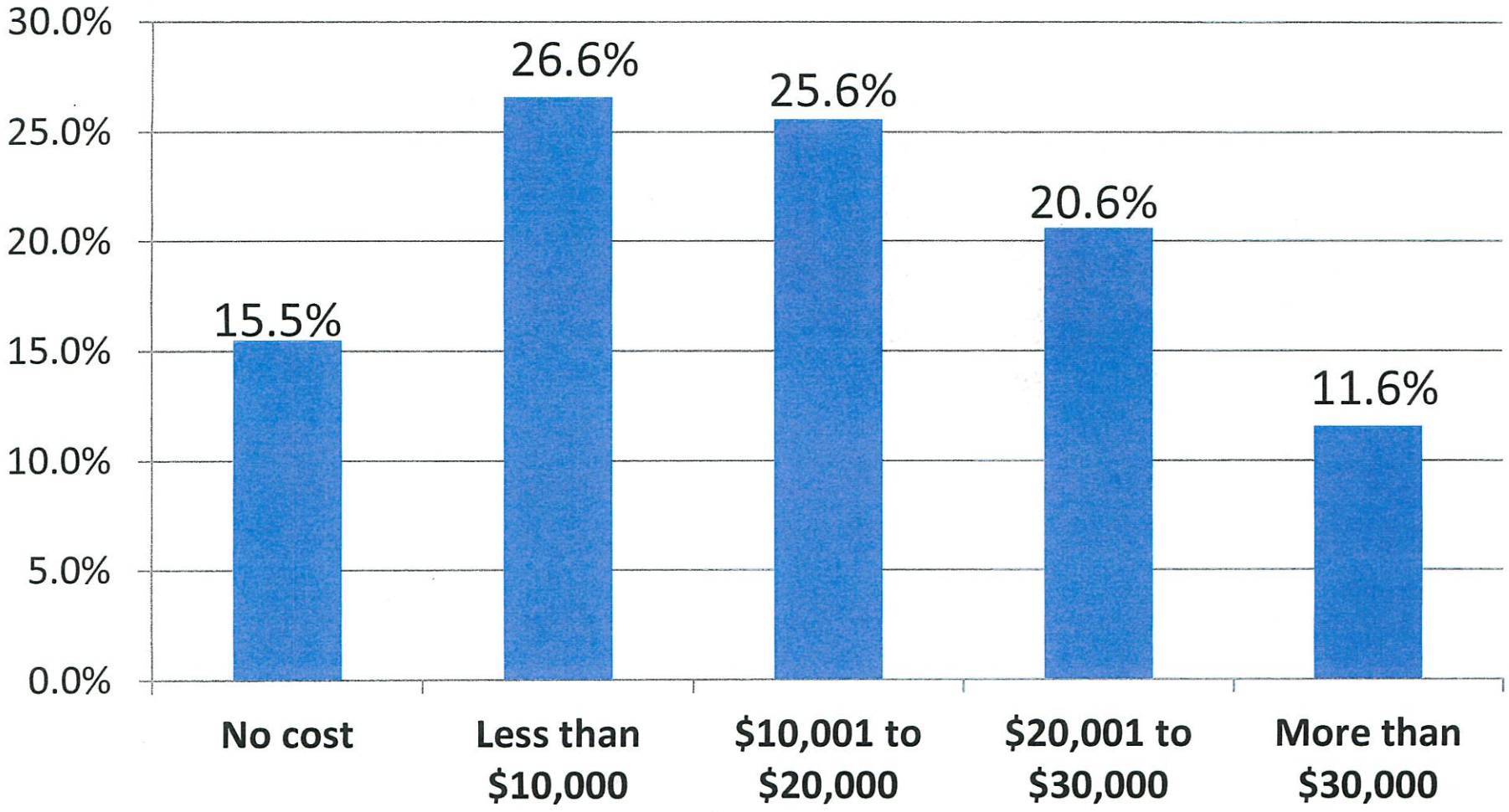


Independent colleges and universities strive to keep cost down for students

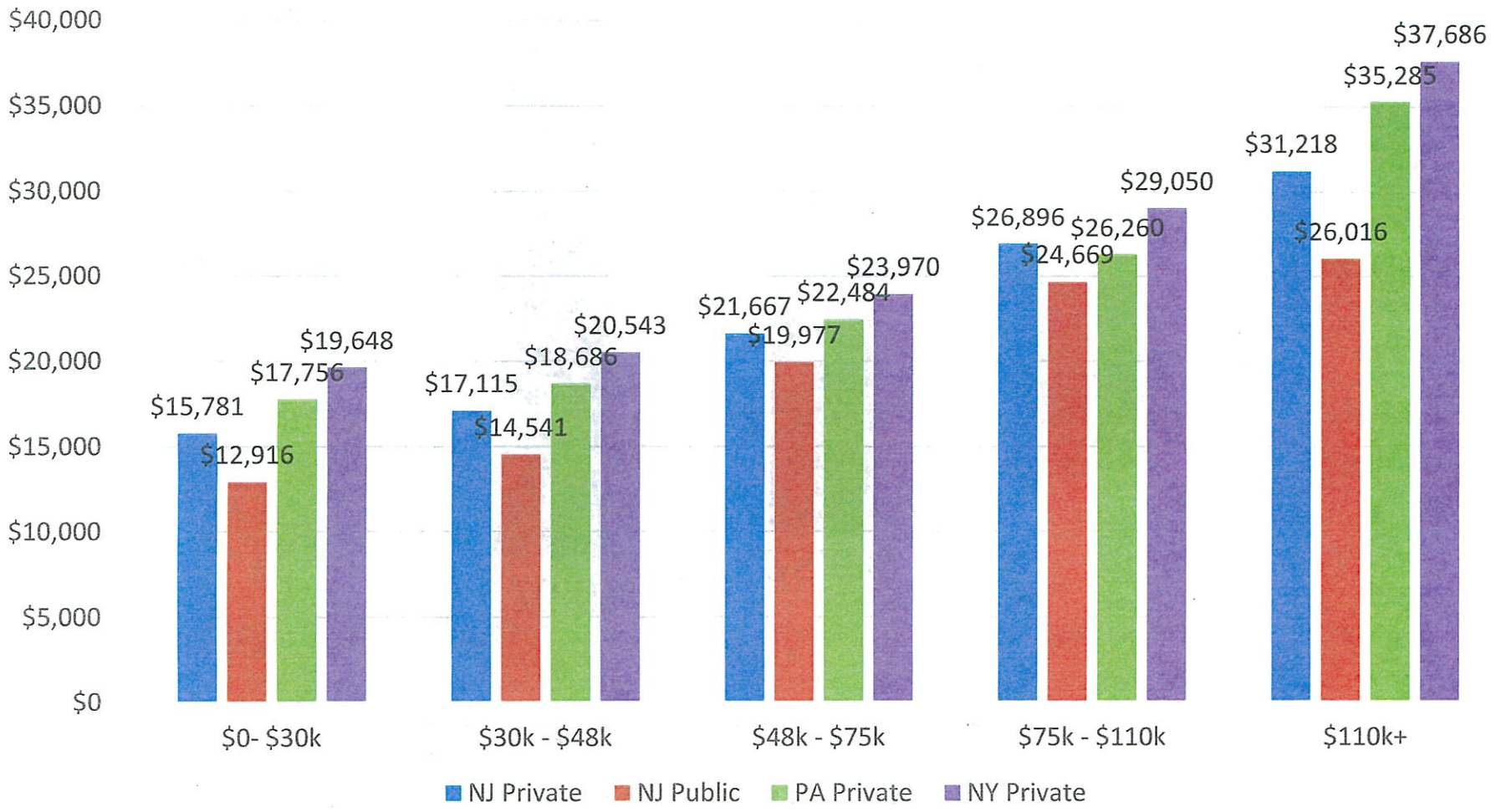
- Provide over $1 billion in institutional aid
- 95% of first time full-time undergraduate students receive some institutional aid including some "promise" programs
- Over 80% of all student aid comes from institutions
- Partnerships with county colleges
  - 2+2 programs
  - Guaranteed admission programs
  - Discounted tuition for transfers from county colleges
  - Degree completion at county college

x25

15% of students attending ICUNJ institutions will pay NOTHING and over 40% of students paid less than $10,000 in tuition and mandatory fees in 2018-19 due to federal, state and institutional aid



NJ Independent colleges "net price" competitive with NJ public colleges and NY and PA independent colleges (2017-2018)



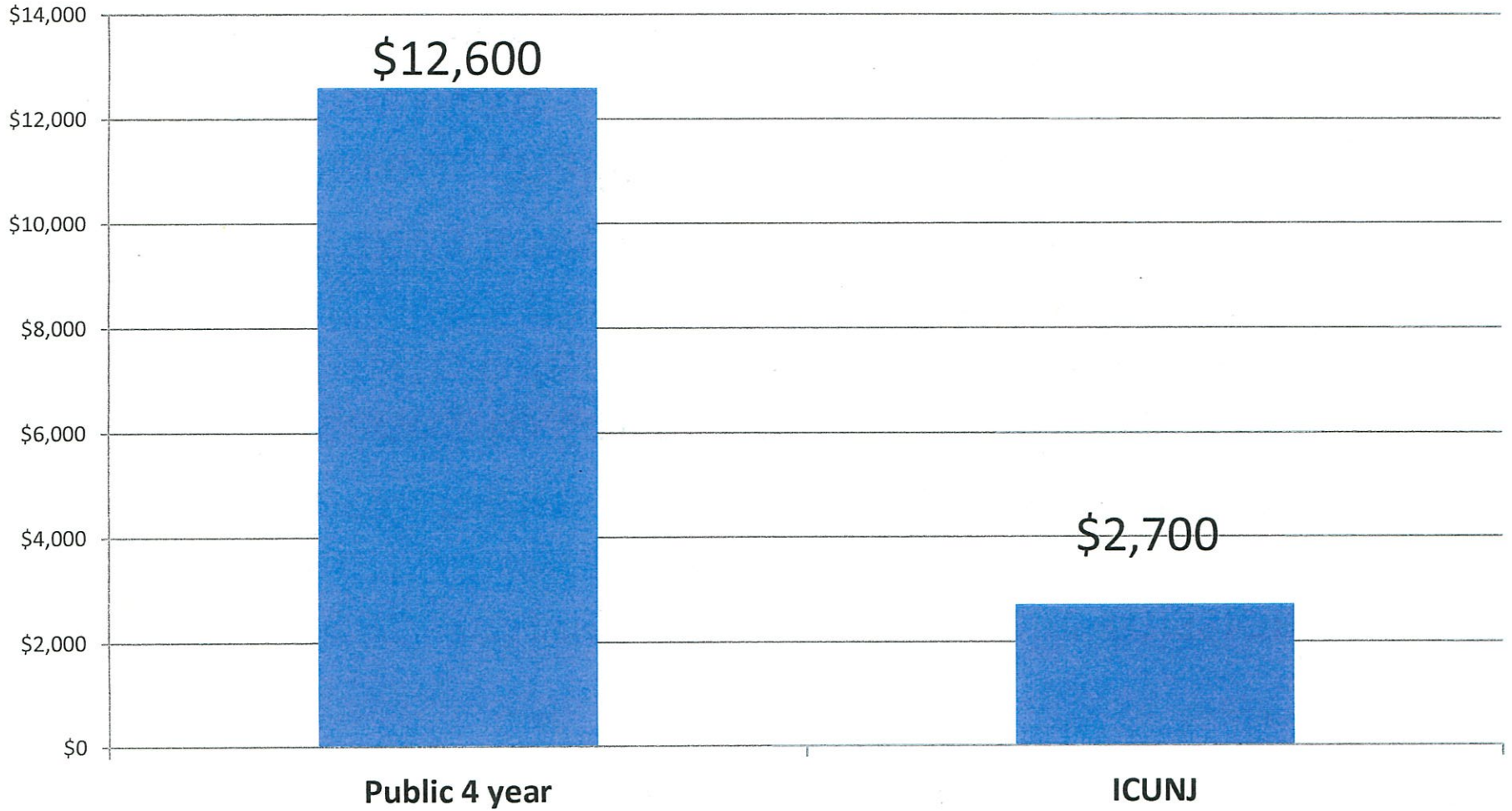
Independent colleges and universities provide over $4 billion economic impact to NJ

- $35 - $40 to $1 return on taxpayer investment
- Over 20,000 employees with payroll of over $1.2 billion
- Additional contract employees in areas of facilities, food service, bookstores, etc.
- Additional money spent on private vendors and contractors including engineers, architects, lawyers, etc.

Independent colleges and universities provide over $4 billion economic impact to NJ

- Projected capital construction of nearly $2 billion in 2022 and 2023
- Out-of-state and international students bring in new money to the state
- Nearly 600,000 living alumni with more than half still living in New Jersey
- Excited to work with Governor and Legislature on future economic development initiatives and growing economy

Providing choice for students and providing results for workforce with limited state resources
$12,600 per student vs $2700 per undergraduate student (FY 2021)



G1x

Summary

- Our 14 independent, non-profit, public-mission colleges and universities are an important component of the overall higher education structure in New Jersey
- Work diligently to continue to provide the access and affordability to offer students more choices and opportunities to stay in New Jersey for college education thus limiting the out-migration
- Face numerous challenges in a market that is becoming more competitive
- Want to work cooperatively with Legislature and Governor on improving access, affordability and the quality of higher education in New Jersey

62x

PRINCETON UNIVERSITY

63x

Princeton Innovation

Princeton University has a robust and vibrant program to support entrepreneurship and innovation in service of its academic mission and is an active participant in the New Jersey innovation ecosystem. Building off of our 276-year history of academic excellence as one of the world's leading research universities, we work closely with academic, industrial, and governmental partners to transition the advances developed in our laboratories, libraries, and facilities to the community at large. Our faculty, research staff and students make discoveries, explore new ideas, create knowledge and invent new technologies that address many of society's most pressing challenges. These include efforts focused on cancer research and health, quantum computing, blockchain technology, energy and environmental sustainability, finance, and advanced manufacturing. In the past year, Princeton's research community has filed almost 200 patent applications with our intellectual property portfolio, providing the basis for nine new NJ-based start-ups.

Princeton Innovation, within the Dean for Research office, is Princeton University's initiative to cultivate, accelerate and elevate innovation and entrepreneurship within the University. Princeton Innovation serves as the access point that helps forge connections among University researchers and partners in academia, industry, government, and entrepreneurship to solve societal challenges. Princeton continues to grow its impact and drive innovation in our region and around the world, acting on its motto "in the Nation's service and the service of humanity."

For any questions or to find out how to plug into the Princeton innovation ecosystem, please reach out to the Vice Dean for Innovation, Prof. Craig B. Arnold.

Selected Princeton Regional Innovation Programs and Resources

I-Corps

The National Science Foundation Innovation Corps (I-Corps™) Northeast Hub is one of five new hubs in a nationwide NSF-funded network of universities formed to accelerate the economic impact of federally funded research – delivering benefits in health care, energy and the environment, computing, artificial intelligence, robotics, advanced materials and other areas – while building skills and opportunities among researchers from all backgrounds, including those historically underrepresented in entrepreneurship. The NSF-funded I-Corps hub, led by Princeton University with NJ partner institutions NJIT, Rutgers, and Rowan as well as other regional partners and affiliates is a key launching point for entrepreneurship in NJ.

National Security Innovation Network

Princeton University has collaborated with the Department of Defense to offer opportunities for faculty, students, and postdoctoral researchers in engineering, entrepreneurship, and other areas. The National Security Innovation Network (NSIN) began in 2016 by the Department of Defense to tap into the talents found at some 70 colleges and universities and at startup companies. It runs a variety of programs to encourage ideas that might be useful to the Department of Defense. The NSIN program impacts the innovation ecosystem in NJ and beyond in a variety of ways including organizing courses to give students an opportunity to solve actual problems that the U.S. military faces or running hackathons – workshops at which teams of students compete over a period of days to answer a specific challenge faced in defense operations.

Princeton Branch of the Ludwig Institute

Princeton University is the home to a new branch of the Ludwig Institute for Cancer Research, an international not-for-profit organization with a legacy of pioneering cancer discoveries for more than 50 years. The Ludwig Princeton Branch focuses on cancer metabolism and its promise for new and better ways to prevent and treat cancer. Ludwig provides its scientists around the world with the resources and flexibility to realize the life-changing potential of their work, to see their discoveries improve human health. This philosophy, supported by robust translational programs, increases the likelihood that the groundbreaking discoveries made by Ludwig researchers lead to products that are attractive for further development. Princeton University is a global leader in disciplines of critical importance to the study of cancer metabolism, including basic cancer research, metabolomics, genomics, biology and the computational and physical sciences. The clinical translation of the Ludwig Princeton Branch discoveries is conducted in partnership with RWJBarnabas Health and Rutgers Cancer Institute of New Jersey, the state's only U.S. National Cancer Institute-designated Comprehensive Cancer Center, as well as more distant collaborations to address key questions.

Princeton-HBCU Alliance for Collaborative Research and Innovation

In May 2022, Princeton University partnered with UNCF (United Negro College Fund) and five historically Black colleges and universities to launch a groundbreaking program designed to enable research collaborations between Princeton faculty and their peers at Howard University, Jackson State University (JSU), Prairie View A&M University (PVAMU), Spelman College and the University of Maryland Eastern Shore (UMES). Princeton University is funding these research collaborations through the Princeton Alliance for Collaborative Research and Innovation (PACRI). The program is open to projects in all disciplines, including engineering, natural sciences, humanities and social sciences.

Princeton Plasma Physics Laboratory

Princeton Plasma Physics Laboratory (PPPL) is a world-class fusion energy research laboratory dedicated to developing the scientific knowledge and advanced engineering to enable fusion to power the U.S. and the world; advancing the science of nanoscale fabrication for technologies of tomorrow; and furthering the scientific understanding of the plasma universe from laboratory to astrophysical scales. PPPL is managed by Princeton University and is the only US Department of Energy National Laboratory in the state of NJ. As such, it provides unique capabilities in a wide range of scientific and technical fields while

their over 400 researchers and technicians have the expertise in cutting-edge technologies to help collaborators advance their research and development efforts. PPPL welcomes collaborations with companies, universities, federal agencies, and state and local governments.

Selected Princeton Entrepreneurship Programs and Centers

The Princeton Entrepreneurship Council

The Princeton Entrepreneurship Council was formed in 2015 to support the growing Princeton entrepreneurial ecosystem. Its vision has grown, as has our connection with the regional innovation ecosystem, from those early days. For Princeton entrepreneurs and those who are entrepreneurially minded looking to develop and improve their skills, learn about new trends and industries, and connect with others in the ecosystem, the Princeton Entrepreneurship Council offers high quality educational programming, mentoring and connections to funding. PEC supports entrepreneurs of all levels of experience, in all types of industries, including not-for-profit environments.

The Keller Center

The Keller Center for Innovation in Engineering Education equips undergraduate students, graduate students and faculty with the knowledge, mentoring and resources needed to conceive and execute projects of personal and societal impact. Keller does so by offering educational opportunities that bridge engineering and the liberal arts and help shape rewarding career paths. This includes curricular and co-curricular programs organized around design, design thinking, entrepreneurship and innovative teaching, at the intersection of technology and society.

Center for Digital Humanities

The Center for Digital Humanities (CDH) is an interdisciplinary research center where humanities research intersects with data, computer and information science. CDH fosters innovation in academic methodologies, technology design, and collaborative research practices, based on the belief that technology must act in the service of a more just future for humanity, and that the application of humanistic approaches enables the creation of better technology. CDH partners with Princeton faculty, students, and Princeton University Library colleagues to incubate innovative digital humanities projects at multiple stages of development - from small seed grants to peer reviewed, chartered projects.

Entrepreneurship Space

Princeton Innovation Center BioLabs

Princeton Innovation Center BioLabs is the premier coworking space for science startups in New Jersey—a unique place to test, develop and grow game-changing ideas. Its mission is to foster innovation, collaboration and entrepreneurship—in essence, to create and grow an innovation ecosystem—by supporting early-stage startups with high potential. The Princeton Innovation Center Biolabs accepts applications from companies both with and without a Princeton affiliation.

Princeton Entrepreneurial Hub

The Princeton Entrepreneurial Hub at 34 Chambers Street in downtown Princeton serves as a hub for entrepreneurship education and an incubator with co-working space for students, faculty, staff, and alumni. Providing a home to a variety of educational events, including workshops, seminars, and visits by University alumni and mentors, the Hub features event conference rooms, co-working space, and private offices. Through the Keller Center's eLab and Tiger Challenge programs, based in the Hub, Princeton's young, aspiring entrepreneurs, innovators, and design thinkers receive funding to further develop their ideas and gain access to a physical workspace, mentorship, advising, and training.

Makerspaces

Princeton provides several makerspace facilities to encourage and support creativity, innovation, design and curiosity among University students, faculty and staff. These open access centers across campus are stocked with resources including 3D printers and scanners, computers with a broad selection of software, die cutters, soldering stations and woodshop tools. Interested innovators can access the CST StudioLab, the Keller Center Makerspace and the Princeton University Library Makerspace.

Selected Princeton Campus Resources

Research With Princeton (RWP) is a public, searchable database of select Princeton University research and scientific facilities. Through RWP, users can review the profiles and research of hundreds of Princeton faculty in the science, technology, mathematics, engineering and policy disciplines; learn about Princeton's world-class scientific facilities that are available for use; discover the expertise of Princeton University's departments, institutes, and centers; view the global collaboration networks of Princeton researchers; search for collaborators by topic; analyze a block of text and find researchers with related work; and see a researcher's recent publications and view article metrics. RWP is part of a State of New Jersey project to highlight the work of research universities in New Jersey. Currently, six universities are piloting the project: Princeton University, Rutgers University, Rowan University, New Jersey Institute of Technology, Stevens Institute of Technology and Montclair State University.

Core Facilities Program

Princeton University is home to world recognized, top-of-the-line scientific and computing facilities that enable research, teaching, and the creation and dissemination of knowledge. To extend these resources to others who share Princeton's mission of service to humanity, and in support of the local innovation ecosystem, Princeton makes certain shared-use research equipment available to external users, helping to further drive the innovation ecosystem in our region. Facilities include: Confocal Microscopy Facility (includes Nikon Center of Excellence), Flow Cytometry Resource Facility, Genomics Core Facility, Imaging and Analysis Center (IAC), Macromolecular Crystallography Core Facility, Micro/Nano Fabrication Laboratory (MNFL), Nuclear Magnetic Resonance Facility, and The Proteomics and Mass Spectrometry Center.

Princeton is an active host for the NJ Commission on Science, Innovation and Technology's Catalyst Research and Development Voucher Pilot Program, with multiple New Jersey-based startups using the University's core facilities. The voucher pilot program is intended to support New Jersey-based early-stage company efforts to accelerate development and innovation of technologies to make a real-world impact.

Princeton Corporate Engagement and Foundation Relations

Princeton's Corporate Engagement and Foundation Relations (CEFR) team works to build collaborations between Princeton researchers and external organizations that hail from New Jersey, across the U.S. and around the globe. Industry, foundations, nonprofits and government are all important partners in the exceptional work of Princeton researchers on the world's most pressing problems. The universal key to successful research collaborations with Princeton is strong alignment with the University's core academic and research strengths. In addition to sponsoring faculty-led research, partners can support fellowships and student capstone projects. Membership in a corporate affiliate program allows companies to have deep, substantive and ongoing dialogue with Princeton faculty.

Office of Technology Licensing

Through expertise, mentoring and resources, the Office of Technology Licensing (OTL) helps faculty, researchers, and students transform Princeton discoveries into innovative solutions to real-world problems. OTL associates help University researchers to explore outlets for technology translation in collaboration with industry partners, investors and entrepreneurs. Over the past few years, the office has expanded support for researchers looking to enhance impact through startups and new ventures. OTL maintains a number of programs for our faculty and researchers, providing entrepreneurial mentorship and support, research funding to expand the development of intellectual property, and support in exploring the creation of new ventures and IP licensing.

STEVENS INSTITUTE OF TECHNOLOGY

69x

STEVENS
INSTITUTE OF TECHNOLOGY
1870

Division of University Relations

1 Castle Point Terrace
Hoboken, NJ 07030
stevens.edu

Entrepreneurship Programs at Stevens Institute of Technology

If you want to build a ship, don't just drum up your crew to gather wood, divide the work, and give orders. Instead, teach them to yearn for the vast and endless sea.
- Antoine de Saint-Exupery

Introduction
Building on a Stevens legacy that has long produced entrepreneurs and innovators, iSTEM@Stevens and Launchpad@Stevens continue to fortify Stevens's future while preparing our students to be the next generation of big thinkers and global leaders.

- **iSTEM –** iSTEM@Stevens is a unique, four-year entrepreneurship coaching program for incoming first-year students is designed to transform budding talent into future leaders and game-changers.

  iSTEM@Stevens funds projects in the following ways:

  - Lab and equipment unique to student's pursuit
  - Branding and marketing coaching
  - Legal incorporation for student's company
  - Professional mentorship
  - Personal tutors for all courses
  - Project-related funding that may arise on a case-by-case-basis

  In the first year, iSTEM connects students to small, hands-on projects and connect passions with societal needs, leading to a "master" idea. In years 2-3, students move through the Launchpad@Stevens program and in year 4 students learn the legal mechanics of starting new ventures and raising capital, while building toward a career as a founder, researcher or a star employee.

- **Launchpad –** Launchpad@Stevens is a 12-month program that provides Stevens students with the opportunity to learn entrepreneurship and innovation by working with real-world entrepreneurs in building new technology-based businesses.

  Launchpad@Stevens kicks off in the spring semester each year with a preparatory meeting where students learn how to identify ideas with potential commercial viability and the steps involved in building a startup. Working with Launchpad@Stevens Director, Dr. Mukundan

STEVENS
INSTITUTE OF TECHNOLOGY
1870

Iyengar or entrepreneurs from the community, they create teams to implement their business idea and create a viable business.

Outcomes & KPIs

- 20 portfolio companies, including 4 in the past 8 months.
- 95.75% retention rate of iSTEM students
- 35 students trained rigorously every year, of which ~15 form companies
- 60 founders now in our network, which includes current + past founders dating back to 2017
- 3+ incorporations every year (on average) when we train 30+ students
- 9:2 Male to female ratio across our programs
- Overall, iSTEM students have an average GPA well above 3.0.

Notable Entrepreneurial Outcomes

- PerlStreet is backed by **Y-Combinator** January 2022 *(YC is a the worlds #1 accelerator). Dakota Wikom is co-founder & CTO.*
- Sutro is backed by **Sequoia Capital,** March 2022. *Sequoia is peer-rated as the #1 VC firm in the world, and has funded the most legendary companies of our times. Hayden Daly joins as the third employee at Sutro*
- Fulament was bootstrapped with $10K in 2019, which today posts **$1.6M ARR** in 3 years. Bahij Nemeh (dropout 2019) is founder & CEO. *Backed by 1517, in talks with Andreesen Horowitz (a16z). A16z is rated in the top 5 VC firms in the world.*
- **More than 20 companies** in our portfolio, founded by current students and recent grads who are all part of our ecosystem. Six are venture backed already, while more than 8 are currently incubated by students who will graduate in 1-2 years.
- A strong community pervades our ecosystem -- founders past and present are united in chat-groups, messaging boards, and meetups. This has been the hallmark for whatever success we are accomplishing -- and ecosystem that wants to help one another succeed.

New Partnerships

1. DoD and NSIN: These entrepreneur minded programs continue to engage us with ideas, hackathons, & initiatives. What they want is a parallel track of our program earmarked for defense needs. However, the programs leadership has changed twice in the last 2 years, making quick progress difficult.
2. TIAA: Nation's largest retirement fund with over $1.3T in assets wants to partner with us to create innovative solutions for GenZ. Over 6 months of engagement got us out first official hack engagement Nov'22
3. Carepoint Hospitals: We have C-level engagements with the largest hospital network in tri-state who are willing to partner with us on innovative healthcare tech initiatives.

STEVENS
INSTITUTE OF TECHNOLOGY
1870

4. Mission-50: Mission-50 has pledged $5k every year as a gift for internal pitch competitions. Additional $5k for inter-college pitches (which we won in 2022).
5. Delphi Digital: Delphi is a well connected Web 3.0/crypto ecosystem that helps bootstrap new currencies and DeFi solutions. They partner with us for due diligence.

SETON HALL UNIVERSITY

73x

Center of Innovation and Entrepreneurship

We've got a new name! The Center for Entrepreneurial Studies is now the Center of Innovation and Entrepreneurship! Today, entrepreneurship – and what we do—encompasses so much more than when the Stillman School of Business launched its entrepreneurship program 17 years ago. Our name change acknowledges the broader role of innovation and entrepreneurial skills in our lives and in our futures. Whether our students desire to launch a company or work for a large corporation, it is the innovators and problem solvers – the true entrepreneurs- who create new ideas, products and services that better our society.

The Center of Innovation and Entrepreneurship fosters the collaboration of faculty, students, alumni and entrepreneurs through an array of initiatives that advance entrepreneurial learning at Seton Hall University. Learn More »

Academic Programs

Students learn about the overall entrepreneurial process and acquire the skills and tools they need to succeed from the launch of a new business to the successful growth of that business. Students are required to complete four 3-credit courses.

Students Invited to Visit One of the State's Fastest Growing Technology Companies

Bryan Jakovcic with his brother Michael Jakovcic, Executive Vice President of Strategy and Business

Do you seek networking, internship, and job opportunities? Do you dream of being your own boss and wonder how successful entrepreneurs create companies?

If so, we invite you to meet Stillman alumnus entrepreneur Bryan Jakovcic '09, and tour his company, Fusion Health, in Woodbridge, N.J. in a field trip event on Friday December 9 from 9:30 a.m. to 1:30 p.m. Fusion is a rapidly growing technology company with more than 100 employees, and which looks to hire students and new graduates for internships, and full-time jobs.

"This is a terrific opportunity for students to expand their career horizons and to find out how a college startup became a national health software provider," said Susan Scherreik, director of the Center of Innovation and Entrepreneurship (CIE). The Dec. 9 field trip kicks off a new CIE program in which students will periodically be invited to visit companies of successful Seton Hall University entrepreneurs, she said.

Fusion manages the health records of nearly 1 million inmates daily, the largest vendor of its kind, and has grown rapidly with no outside investments. The venture has been recognized for five consecutive years by INC. magazine as one of the fastest growing companies in the United States and is ranked the state's ninth fastest growing private small company. Fortune magazine named it one of the Best Places to Work in the New York Metro Area and Fusion has also been recognized by Deloitte on its Fast 500 list of fastest-growing technology companies in the United States.

CIE will provide free transportation to and from the event, which includes a tour of the company's facilities, and lunch with Jakovcic and other top-level Fusionites. Field trip participants will leave from the South Orange campus by van at 9:30 a.m. and will return to campus by 1:30 p.m., Scherreik said.

Jakovcic attributes Fusion's success to his dynamic employees. "Our fundamental belief is that employee satisfaction is critical to achieving our mission and vision, so we facilitate a supportive team-based atmosphere," Jakovcic said. He noted that the company's employee satisfaction surveys are consistently high "because we ensure that employees feel a part of the Fusion family. We have company sports leagues, volunteer events, virtual retreats, on-site cookouts, holiday parties, and more ways for Fusionites to participate and build meaningful connections," he added.

Brian Sumereau '21, joined Fusion after graduating from Stillman with a double major in Finance and Information Technology, with certificates in Business Analytics and Market Research. Sumereau, who was also a member of the Gerald P. Buccino Leadership Program, said students tend to overlook opportunities at smaller companies. But a big plus of working at Fusion, Sumereau said, is exposure early in his career to many different departments, including management, analytics, programming, and accounting.

Jakovcic studied finance while a Stillman student and also served as president of the Entrepreneurship Club. He has maintained close ties with his alma mater, and currently is Chair of the CIE Board of Advisors. Last year, Jakovcic was inducted into the Seton Hall University Entrepreneur Hall of Fame. Additionally, he received the Ernst & Young Entrepreneur of the Year award in 2020.

Students of all majors are encouraged to attend the field trip event. If you would like to register for the field trip, please email Susan Scherreik. Space is limited.

SHU Celebrates Women Entrepreneurship Week!

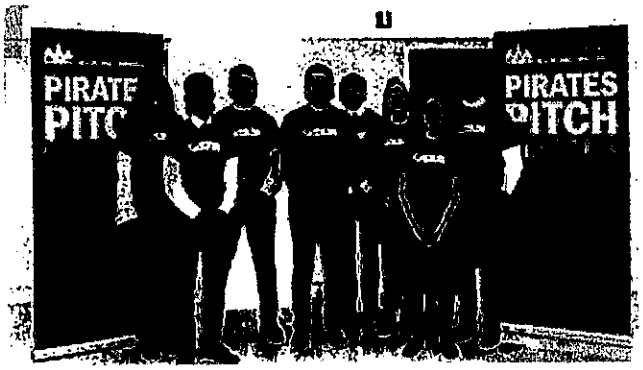
Would you like to win a prize for your innovative startup business idea? Interested in finding out more about entrepreneurs? Join us in a celebration of Women Entrepreneurship Week on **Thursday, October 20 at 7 p.m.** in Jubilee Hall, Room 528, the Entrepreneurship Center.

The Stillman School of Business Center of Innovation and Entrepreneurship (CIE) and the Entrepreneurship/C.E.O. Club are hosting a fun and engaging Pitch Slam contest. Participating students will be given 90 seconds to pitch their innovative and original business idea. Top winners will receive a $50 Amazon gift card and a Seton Hall University Entrepreneur T-shirt. All undergraduate and graduate students invited!

The event will kick off with special guest speaker Alissa Lopez '19, M.B.A., founder of Family Balance Planner, a life coaching platform to help families prioritize their goals to help them keep their days organized and balanced. Alissa will speak about her entrepreneurial journey and provide tips on how to deliver a perfect pitch. While a Stillman student, Alissa competed in both local and national entrepreneurship competitions, winning both the Seton Hall University Pirates Pitch Startup Competition and NJIT New Business Model Competition. Alissa serves on the CIE Board of Advisors and has been an instructor in the Pirates LaunchPad Summer Accelerator Program since 2019. Alissa and entrepreneurship faculty members will serve as contest judges.

For more information, contact CIE Director Susan Scherreik

Ten High School Entrepreneurs Virtually Compete for $50,000 in Prizes and Scholarships During Pirates Pitch Contest



Ten high school entrepreneurs committed to launching their own start up or receiving support for fledgling businesses will virtually compete as finalists in Seton Hall University's eighth annual High School Pirates Pitch competition, hosted by the Center of Innovation and Entrepreneurship at the Stillman School of Business **from 3 p.m. to 6 p.m. on Friday, November 18.** To attend the Microsoft Teams event, click here.

These future business leaders have successfully submitted original business proposals describing an innovative product or service in 350 words or less. The students next face off in a "Shark Tank" style competition, after passing their first hurdle against 180 young entrepreneurs from 15 U.S. states and five foreign countries to qualify for more than $50,000 in prizes and tuition scholarships to the University. They will convey their startup ideas in five-minute presentations to an independent judging panel of faculty members and successful alumni. The University community and the public are invited to watch these pitches and cheer for their favorite contestant in this live-streamed event, which will include a five-minute Q&A session and all will receive valuable feedback from the judges.

"Their projects are wide-ranging, including virtual clothes fitting, language-based online math training, artisanal tea cubes, and a way for athletes to stay hydrated on the playing field. Some of the students have focused their efforts in 'social entrepreneurship,' employing entrepreneurial skills and knowledge to help their communities and change the world. One student aims to recycle tennis balls, and another wants to connect university students with high school students in underserved communities for help with college applications. Several of the students have already launched their businesses and are operating ventures," said Susan Scherreik, founding director of the Center of Innovation and Entrepreneurship in the Stillman School of Business.

"Entrepreneurial education is more crucial than ever, and we celebrate the innovation and creativity of these amazing ten finalists. Their projects demonstrate a can-do entrepreneurial spirit that we need now more than ever to solve the numerous challenges our world faces and

that are especially valued in today's business climate. They are on their way to becoming tomorrow's entrepreneurial leaders and change-makers," Scherreik added.

Scherreik explained that some students have been developing their startup projects in their high school entrepreneurship courses, as entrepreneurship is increasingly becoming a popular business offering in high school as well as in the university curriculum.

"All students who are participating receive important business lessons on how to be nimble and flexible and I am impressed by their confidence and passion in this process," she said.

Seton Hall University's popular teen startup competition takes place during the third week in November to celebrate Global Entrepreneurship Week (GEW), which spotlights the millions of people around the globe who are unleashing their ideas to start and scale new businesses. This year, GEW will sponsor a total of 40,000 events and activities in 200 nations.

All qualifying finalists will receive at least $4,000 in tuition scholarships to attend Seton Hall. The top finalist will receive a $2,500 cash award and a $10,000 tuition scholarship. The second-place winner will receive a $1,000 cash award and a $6,000 scholarship. The Audience Choice Award winner will receive $300.

This year's finalists include:

- Aishani Bal, a junior at Denmark High School in Cumming, GA.
  - Startup Idea: asecondlife
- Joshua Cuman, a senior at Don Bosco Preparatory High School in Mahwah, NJ.
  - Startup Idea: MySty
- Ryan Heneghan, a senior at Rham High School in Hebron, CT.
  - Startup Idea: InstaCaddie
- Shaomin Kee, a junior at Lambert High School, Suwanee, GA.
  - Startup Idea: ChillPak
- Liam Levantovich, a senior at New Visions Honor Academy, Horseheads, NY.
  - Startup Idea: Truefood
- Lily Liu, a sophomore at New Providence High School in New Providence, NJ.
  - Startup Idea: NetLoveNJ
- Cienna Mitchell, a sophomore at Park Ridge High School, Park Ridge, NJ.
  - Startup Idea: Hydroguard
- Stefan Neuber, a senior at Windsor High School, Windsor, CA.
  - Startup Idea: MatheX
- Brianna Robinson, a junior at Archbishop Molloy High School, Queens, NY.
  - Startup Idea: Bri's Varia-Teas.
- Dashawn Sheffield, a senior at North Star Academy Washington Park High School, Newark, NJ.
  - Startup Idea: EduMatch

The prominent judging panel includes Stillman business faculty and alumni entrepreneurs: **Dr. Elizabeth McCrea**, associate professor of management and entrepreneurship; **Sunny**

Bathla '00/MBA '15, senior vice-president, Virtusa, and founder, OSB Co. and **Alissa Lopez,** M.B.A. '19, founder and CEO of the Family Balance Planner, and first-place winner in the Seton Hall collegiate Pirates Pitch competition. Also on the panel are **Patrick Burd**, '18, founder of Classic Soccer Cleats and recipient of the 2021 Seton Hall University Emerging Entrepreneur Award, and **Victor Gomez**, '17, manager of Seton Hall Esports, winners of the 2022 BIG EAST League of Legends and Rocket League Championships.

Seton Hall's High School Pirates Pitch helps develop and showcase entrepreneurial skills that align with the World Economic Forum's list of the top skills that professionals need to thrive in 2021, including complex problem-solving, critical thinking, and emotional intelligence. The competition also introduces students to the Stillman School of Business, its Center of Innovation and Entrepreneurship, and its nationally-ranked Center for Leadership Development within the Buccino Leadership Institute.

Success Stories

Planet Honda

- Challenge - Improve TV ads and determine what resonates
- Insights - TV ads were memorable, but too loud and too much content
- Recommendations - Keep ad themes, but modify tone and improve focus
- **Results - New ads rated as 'significantly improved' which strengthened likelihood of visiting dealership**

Hackensack University Medical Center

- Challenge – Improve 4 gift stores' business with 8,000+ employees
- Insights – Uncovered communication 'disconnect' with hospital employees
- Recommendations – Needs assessment and customer loyalty program
- **Results – Logo merchandise for employees to encourage pride and regular intranet communications about store specials**

Stony's Restaurant

- Challenge - Attract more Seton Hall students to South Orange eatery
- Insights - Need alternative ways to reach student demographic
- Recommendations - Facebook, curbside service and special promo nights
- **Results - Created 'Seton Hall Night'. Sales doubled. 25% increase overall. New Facebook page generated > 2,000 fans in 3 months**

J. Bullivant Urban Survival Gear

- Challenge – Understanding preferences on a new 'survival' backpack
- Insights – Identified key drivers of interest and style preferences
- Recommendations – Emphasize backup power and customization
- **Results – Development of a product line extension and design modifications to enhance customer appeal**

MRC Honors RE-HERO-ED Cofounder

Tobias von Rohr, RE-HERO-ED cofounder, is named a Seton Hall University Market Research Center "Business Partner of the Year" at the 2017 Pair Up with the Pirates awards reception. Von Rohr and MBA student Sarah Solomon discuss the success of the project, which explored consumer awareness and social media advertising.

80x

MRC Honors Goya Sr. Marketing Reps

Goya Foods' Alvaro Serrano and Lew Brosowsky, senior marketing representatives, are named Seton Hall University Market Research Center "Business Partners of the Year" at the 2017 Pair Up with the Pirates awards reception. Serrano, Brosowsky and student Jeremy DeJesus '17 discuss the success of the project, which explored introducing Goya's juices and nectars to a new target market.

MRC Honors Maplecrest's Jen Miller

Jen Miller, head of marketing at Maplecrest Ford Lincoln, is named a Seton Hall University Market Research Center "Business Partner of the Year" at the 2017 Pair Up with the Pirates awards reception. Miller and student Joshua Caruso '16 discuss the success of the project, which explored improvements to the website.

Georgian Court University

- The Georgian Court University's School of Business and Digital Media (SBDM) held its first SBDM Showcase and Competition in December 2021 which highlights student class projects, research and internships. Students presented in a speed-round style competition – delivering three-minute presentations of only three slides.

- The SBDM also launched the #InvestinYourself programming and hosted multiple workshops throughout 2021-2022. Topics include networking skills, presentation skills, the importance of teams in the workplace, and citations and copyright.

- We have also developed a High School Pitch Competition initiative (similar to television's Shark Tank), further demonstrating GCU's commitment to nurturing the next generation of young entrepreneurs and innovators.

- In the non-matriculating domain, our main offering within the 'ecosystem' is an online course to help prepare start-ups: Entrepreneurship: Start-Up And Business Owner Management - Georgian Court University, New Jersey. We also plan to release a Professional Online Global Entrepreneurship Certificate offering this spring – in partnership with the Newark Business Hub and other industry leaders from within the start-up, microfinancing, social responsibility, asset attainment/management, and other domains. There are multiple target audiences within our plans, including a potential partner/contract funded focus on supporting Women of Color entrepreneurs.

- At a high level, GCU is still working to address the needs of the healthcare industry through expanding the offerings of our Nursing program and other health professions.

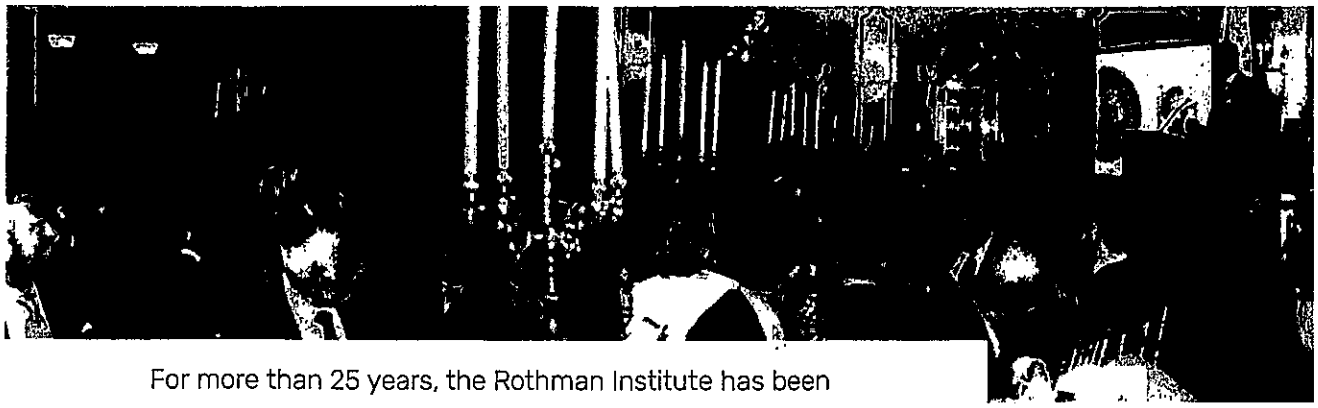
- In October, we launched our "Recharge" campaign which is offering those with some college and no degree opportunities to complete their degree in flexible and remote ways.

Fairleigh Dickinson University

83x

FAIRLEIGH DICKINSON UNIVERSITY

Search | Menu



For more than 25 years, the Rothman Institute has been helping our business school graduates succeed in becoming leading entrepreneurs and market innovators.

Our vision is to empower people and communities to grow through education.

Helping Entrepreneurs and Innovators Succeed

Part of the Silberman College of Business since 1989, the Rothman Institute supports entrepreneurship and innovation in the academic, business, and nonprofit communities. An outstanding entrepreneurship curriculum taught by an excellent faculty has helped make the academic program among the top 20 in the nation. In addition, our innovative outreach programs help people succeed in their new or growing ventures as well as in their corporations or organizations.

Executive Coaching

Rothman Institute is proud to partner with Jo Colontonio, Ignite Business Partners on ICF Accredited Executive Coaching Program .

84x

In one semester you can earn a certificate and get the skills needed to launch a new business. U.S. Veterans and their family members can choose from an all-online version or in-person classes on the Florham campus.

February to March winter session: online course.
March to May spring semester: 10-week in-person course, Florham Campus.
October to December fall semester: 10-week in-person course, Florham Campus.

Family Business Alliance

fdu.edu/family

Established in 1992, the Forum is a membership-based program designed to help family firms successfully grow and ensure smooth transitions to the next generation.

January to April: Three monthly breakfast meetings in the spring semester
September to December: Three monthly breakfast meetings in the fall semester
10 breakfast peer group mentoring sessions per year
December: Holiday Social

NJ Family Business of the Year Awards

fdu.edu/fboya

The awards have recognized the state's finest family businesses since 1992.

June: Nominations are due.
October: Awards luncheon.

FDU Students

FDU students pitch their business idea to a panel of judges and compete for cash prizes.

April: FDUPitch at fdu.edu/fdubizidea

85x

New Jersey Small Business Development Center (SBDC) . The SBDC is a national network of non-profit assistance centers directly funded through the Small Business Administration (SBA), state partnerships, and their host institutions. We strive to be the premiere no-cost small business consulting resource.

Small Business Series: These workshops run from 8:30 AM to 10:30 PM, covering a variety of business topics presented by professionals and educators. The workshops are free, include breakfast, and are sponsored by local corporations.

April: free breakfast workshop.
September: free breakfast workshop.

Annual Lectures and Events

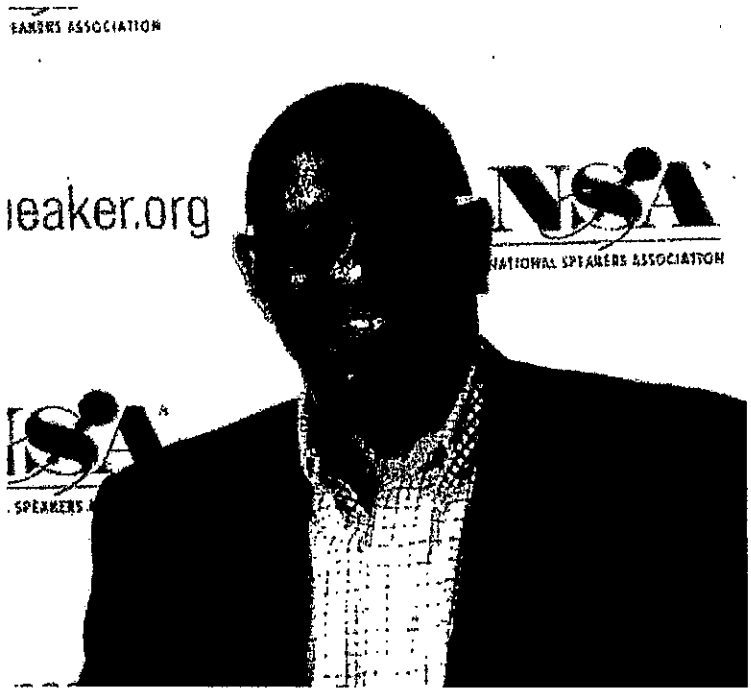
Rothman's annual events offer an opportunity to enjoy networking with colleagues and to hear from successful businesspersons from the surrounding area.

March: Distinguished Entrepreneurial Lecture
April: NJ Female Entrepreneur Lecture at NJ Business Idea Awards Dinner
October: Women Entrepreneurship Week Panel
November: Innovation Lecture

86x

Opportunity Zones … we need Entrepreneur Zones

May 3, 2019 ROI Magazine Op-Ed
By **Dr. Dale G. Caldwell, Rothman Institute of Innovation and Entrepreneurship**



Dr. Dale G. Caldwell is a professor and the Executive director at Fairleigh Dickinson University's Rothman Institute of Innovation and Entrepreneurship - *Fairleigh Dickinson University*

Small businesses are the largest employers in the United States. These enterprises are the heart of the middle class, because they provide the income that residents need to survive in this challenging economy. Increasing the number of successful entrepreneurial businesses in every community in the United States is the only sustainable way to generate the tax revenue and employment necessary to reduce taxes and help the country through its current fiscal crisis. This is especially true in the poorest urban communities.

I believe that the best social program is a job. The quickest way to turn around low-income communities is to create new jobs that provide previously poor households with the income they need to pay their monthly bills on time. The

Unemployment Rate Index (URI) is a measure I developed to estimate the number of jobs required to make the municipal unemployment rate equivalent to the state unemployment rate. To calculate the URI, I simply subtract the state unemployment rate percentage as determined by the federal Bureau of Labor Statistics (4% in my home state of New Jersey in 2019) from the municipal unemployment percentage calculated by the U.S. Census. I then multiplied that percentage difference by the municipal population. The resulting number represents the number of new jobs needed for the municipality to have the same unemployment rate as the state.

The URI results are insightful because they suggest that, in the largest city in New Jersey, Newark, an increase of 23,768 jobs would significantly increase student academic achievement, reduce crime and enhance the quality of life in the city. However, in the second largest city in the state, Jersey City, only 7,113 new jobs are needed to make the same transformation. The relocation of firms from New York City's Wall Street to Jersey City accounts for the significant difference in jobs needed in two cities of similar size. The wonderful thing about this analysis is that it can be utilized in any municipality in the country.

The most effective way to create these jobs is for the state to provide the tax incentives, regulation relief and financial support that local entrepreneurs need to help them increase profitability and employment in the local community. I believe that every governor and state legislature in the country should work together to create jobs through something that I call "Entrepreneur Zones," or "EZones," within the poorest sections of existing Opportunity Zones.

The Tax Cuts and Jobs Act passed by Congress in 2017 contains a unique economic development and tax incentive called Opportunity Zones. This program was designed to encourage long-term private capital investment in low-income communities in the United States. The purpose of this tax incentive is to spur economic development and job creation in distressed communities by providing tax incentives to investors. However, Opportunity Zones encourage investment in real estate assets, not risky entrepreneurial businesses in poor communities.

I am suggesting that federal and state Entrepreneur Zone legislation be created to ensure that a significant amount of the money invested in Opportunity Zones is focused on increasing the number of jobs and business tax revenue for both municipalities and states. The establishment of Entrepreneur Zones should

88X

ensure that investments in Opportunity Zone locations are more impactful than they were in previous programs.

However, the jobs created should pay sufficient income to enable households to pay their basic expenses. Using the MIT Living Wage Calculator and the U.S. Census, I developed a measure of poverty called the Living Wage Index or "LWI." This measure indicates the percentage of households in any municipality in the country that earn sufficient income to pay their basic bills. This data suggests that there is a major economic crisis in every city in the country. I define poverty as a household that does not earn enough money to pay their monthly bills. There are 144,634 households in Newark and 97,498 households in Jersey City who do not earn enough money to pay their basic bills. Tragically, in every major urban community in the United States, half or more of the households do not make enough money to pay their bills.

The only sustainable way to increase jobs and the LWI is for states and local governments to create Entrepreneur Zones and provide the incentives necessary to help these businesses succeed and create local jobs paying the income necessary to enable households to pay their monthly bills.

Dr. Dale G. Caldwell is a professor and the executive director at Fairleigh Dickinson University's Rothman Institute of Innovation and Entrepreneurship. He created the "Entrepreneur Zone" program to revitalize main street businesses and reduce systemic poverty. Dr. Caldwell graduated from Princeton University with a BA in economics, the Wharton School of the University of Pennsylvania with an MBA in finance and received his doctorate from Seton Hall University.

89X

Ending Poverty with Entrepreneurship

By Dr. Dale G. Caldwell (DrDaleCaldwell@gmail.com)

This article appeared in the *Group of Nations Magazine* on March 18, 2021.
(This influential publication is sent to the leaders of 20 of the largest countries in the world)

Rev. Gilbert H. Caldwell, Rev. Ralph Abernathy, and, Dr. King in Boston in 1965

My father, the late Reverend Gilbert H. Caldwell, Jr. was a Civil Rights Movement "foot soldier" who knew and marched with Dr. Martin Luther King, Jr. As a child of the "Movement," I paid close attention to Dr. King's strategic approach to transforming the United States. Most people are not aware that the official name of the march where he delivered his famous "I Have a Dream" speech was the "March on Washington for Jobs and Freedom."

In this historic speech, he states that it is tragic that some people live "on an island of poverty in the midst of a vast ocean of material prosperity." Dr. King knew that racial equality would only be sustainable if residents of poor communities had jobs that enabled them to pay their monthly bills. I am convinced that if he were alive today, Dr. King would say that the economic stability of communities is the foundation of the social well-being of countries.

90x

No country has sufficient funds to fight poverty in perpetuity. Current "top down" poverty reduction programs providing a "safety net" have had little success reducing systemic poverty. The current safety net programs trap families in a net of economic instability that is difficult to untangle. It is time for a "people up" poverty reduction program designed to provide a "safety trampoline" that bounces people up from poverty to the middle class. Poverty reduction strategies must be based on the belief that if you give someone a fish you can feed them for a day. However, if you help them start a fishing business you can feed a community for a generation.

The United Nations made "Ending poverty in all its forms" its number one Sustainable Development Goal because the inability of people throughout the world to feed, house, cloth and educate their families is a "cancer" on society that can be cured if innovative new approaches are implemented at the community level. The Grameen Bank microfinance program, created by the 2006 Nobel Peace Prize winner Mohammed Yunis, is an example of a successful innovative program that works very well in certain circumstances. Unfortunately, the community development bank approach has limited applicability in many locations. One of the most successful ways to reduce poverty in the Group of Twenty (G20) countries is to implement a place based program called "Entrepreneur Zones" or "EZones."

Specific words can be a powerful tool in generating support for a community revitalization program. The term "Entrepreneur" refers to a specific person committed to utilizing novel approaches to creating value. The term "Zone" is a specific location with clear boundaries. Historically, poverty reduction programs have been disconnected "social support" programs that exist as long as there is political support and government funding.

The EZones are a "social investment" program designed to help entrepreneurs create jobs and generate greater income and tax revenue. One of the key components of the program is the provision of quality job training and placement for residents. By investing in EZones with public funding, private investment, grant funds and tax credits, economically challenged communities can generate the revenue and jobs needed to reduce local poverty in a sustainable way (without the need of long-term government funding).

One of the best examples of an Entrepreneur Zone was the Greenwood Section of Tulsa, Oklahoma. Plessy v. Ferguson was a landmark Supreme Court decision in 1896 that upheld the constitutionality of racial segregation in the US. Black communities survived this racist ruling by developing, what we would consider today as, segregated EZones that succeeded economically because of thriving black-

91x

owned small businesses. These neighborhoods fought against discrimination by developing healthy communities rooted in entrepreneurship.

The wealthiest of these communities was the Greenwood Section of Tulsa. This community was so strong economically that it was nicknamed "Black Wall Street." White supremacists and the local government were so jealous of the economic success of this community that on June 1, 1921 they bombed it by plane and attacked it by foot. Tragically, more than 300 people were killed and 200 businesses destroyed simply because the black community was living the "American Dream" of entrepreneurial success.

One positive lesson that we can learn from this embarrassing American history is that when economically challenged communities are given the opportunity to develop entrepreneurial businesses they can flourish and transform poor communities into middle class communities. Government leaders committed to implementing sustainable solutions to chronic poverty, should establish EZones in economically challenged communities around the world. Businesses in these locations should receive public funding, regulation relief, investment fueled by tax credits, low-cost consulting or pro-bono consulting services grants and entrepreneurship training. In addition, qualified nonprofit organizations should provide poverty-informed job training and placement programs helping the long-term unemployed find jobs.

Government programs providing housing, education and health services should be aligned and leveraged to provide more comprehensive and effective support to residents of the EZone community. By creating Entrepreneur Zones in economically challenge communities, we can move the world closer to Dr. King's "Dream" of a society where all people live in an "ocean" of financial stability and social well-being.

Dr. Dale Caldwell is a professor and the executive director of the Fairleigh Dickinson University (FDU) Rothman Institute of Innovation and Entrepreneurship. He is the author of seven books including the ground-breaking publication Intelligent Influence: The 4 Steps of Highly Successful Leaders and Organizations. Dr. Caldwell is the creator of the Entrepreneur Zone (EZone) initiative and is in the process of implementing this innovative poverty reduction program throughout the world. He is also the founder of the Dale Caldwell Foundation, the Black Educators Hall of Fame, the Black Entrepreneurs Hall of Fame, the Black Inventors Hall of Fame and the Black Tennis Hall of Fame. These innovative organizations inspire

92x

excellence and immortalize accomplished people who have been overlooked in the history books because of their race.

Dr. Caldwell earned a BA in Economics (with a minor in African American studies) from Princeton University, an MBA in Finance from the Wharton School of the University of Pennsylvania and a Doctorate from Seton Hall University. He is an International Coach Federation (ICF) Associate Certified Coach (ACC) who completed the Harvard Kennedy School Senior Executives in State and Local Government program and the Rutgers Leadership Coaching for Organizational Performance program.

Rev. Caldwell, Dr. King, a Policeman and Rev. Abernathy marching in Boston in 1965

93x

FAIRLEIGH DICKINSON UNIVERSITY

Rothman Institute of
Innovation and Entrepreneurship

Overview of Entrepreneur Zones (EZones)

History of the Program

FDU Rothman Executive Director Dr. Dale Caldwell created the concept of "Entrepreneur Zones" or "EZones" to be an innovative new approach to increasing the likelihood that small businesses in urban, suburban and rural communities succeed. He has written a very popular research paper as well as articles about the need for EZones throughout the world. This idea was so well received by the New Jersey Governor and Legislature that legislation was approved in 2020 creating an Entrepreneur Zone Working Group chaired by Dr. Caldwell. This group is focused on recommending ways that the state and local government can support the creation and success of EZones throughout New Jersey.

Program Description

An EZone is a geographically designated area within a municipality that houses a group of existing and start-up small businesses. Where it makes sense, a Small Business Development Center (SBDC) consultant will be the consultant and guide for businesses within the EZone. Historically, "enterprise" and "opportunity" "zones" are focused on geographic areas or entrepreneurs acting independently. These programs help financially strong businesses but often accelerate the demise of new or struggling businesses.

The EZone is a collaborative and supportive small business ecosystem specifically designed to help local enterprises collectively overcome obstacles so that they can pivot rapidly and grow. There is no cost to local communities to start an EZone. However, the success of EZone businesses can significantly increase taxable income for the municipality and jobs for residents.

Benefits of the Program

Businesses within the EZone benefit from shared-services and receive mentorship, consulting, education and access to investors. These resources allow business innovation and new ideas to take shape while operating in a more efficient and collaborative business environment. The EZone provides entrepreneurs with essential free or low-cost training services. In addition, participating businesses receive essential consulting that includes document digitization, business plan creation, marketing guidance, sales training, manufacturing assistance, technology development, lending assistance, exporting and importing support, disaster recovery assistance, procurement guidance, contracting aid, social media support and market research help.

94x

Current Locations in New Jersey

The FDU Rothman Institute is working with Chambers of Commerce and Small Business Development Centers (SBDCs) throughout New Jersey to establish EZones in urban and other communities. These small businesses will receive free consulting from the local SBDC. The FDU Rothman Institute will continue to coordinate and monitor these EZones. We are in the process of rising funds from large businesses to pay for SBDC consulting and FDU Rothman's coordinating activities. Here is a list of the current locations of the EZones in New Jersey.

Entrepreneur Zones in New Jersey

1. **Newton EZone**
2. **Dover EZone**
3. **Bernardsville EZone**
4. **Camden EZone**
5. **Atlantic City EZone**
6. **Trenton EZone**
7. **Cape May EZone**
8. **Plainfield EZone**
9. **Jersey City EZone**
10. **Newark EZone**
11. **Lyndhurst EZone**
12. **Hackensack EZone**
13. **New Brunswick EZone**
14. **Asbury Park EZone**
15. **Bridgeton EZone**

Process of Establishing New Ezones in New Jersey

Every EZone is unique. However, to establish an EZone we attempt to follow these six steps:

1. **Step 1: Introductory Meeting**: Meet with a municipal, chamber and/or economic development leader who is focused on supporting the growth of small businesses. The purpose of this meeting is to introduce them to the concept and importance of EZones and discuss next steps.

2. **Step 2: Initiator Meeting**: Meet with the individuals or organizations that will be the local driver of the EZone. Develop an EZone roll-out plan with them in this meeting.

95x

3. **Step 3: Sponsor Meeting**: Meet with corporations, government entities or nonprofits interested in sponsoring the EZone and/or businesses within the EZone.

4. **Step 4: SBDC Meeting**: Meet with the local SBDC leader and discuss their consulting strategy to support the business growth needs of the businesses within the EZone.

5. **Step 5: Business Listening Meeting**: Meet with the businesses that are potentially interested in being part of the EZone. The goal of this meeting is to let the businesses know about the benefits of the EZone and hear the specific challenges preventing the growth of their businesses.

6. **Step 6: EZone Initiation**: An FDU Rothman Institute representative, the SBDC consultant and a member of the local lead organization will meet with the EZone businesses to begin the training and consulting required to help them increase profitability. This starts a process designed to grow EZone businesses and create local jobs.

EZone Mission and Vision

The mission of the New Jersey EZone program is to increase the success of local entrepreneurs in a manner that reduces poverty by creating jobs. The program will have 30 EZones (comprised of 15 businesses on average) generating more than $40 million dollars in gross revenue. Our vision is that our efforts will help these businesses double their gross revenue within three years.

Please call Dr. Caldwell at (732) 208-9808 or email him at dcaldwell@fdu.edu for more information about EZones.

96x

AMERICA'S SBDC NEW JERSEY 45 YEARS

DRIVING NJ BUSINESSES TO THRIVE

NJSBDC NETWORK-WIDE ECONOMIC IMPACT

2019 • 2020 • 2021

$6,550,542,020
SALES

Sales revenues generating millions of dollars in business tax revenues to the overall Treasury and an estimated $216,986,704 in sales tax revenues to NJ

FEMALES 14,168 — 53%

MALES 12,498 — 47%

DISADVANTAGED BUSINESS ASSISTANCE BREAKDOWN

HISPANIC / LATINO AMERICAN	BLACK / AFRICAN AMERICAN	VETERANS / DISABLED VETERANS
14,219	7,925	1,182

$318,596,295 — CAPITAL INFUSION
Clients generated more than $318,596,295 in sales revenues.

1,049 — BIZ STARTS
1,049 NJSBDC clients started a new business.

14,095 — IN-BIZ CLIENTS
14,095 NJSBDC clients started were established businesses.

15,798 — CLIENTS COUNSELED
NJSBDC counseled 15,798 clients one-on-one.

59,033 — COUNSELED HOURS
Delivered 59,033 total counseling hours to small business clients.

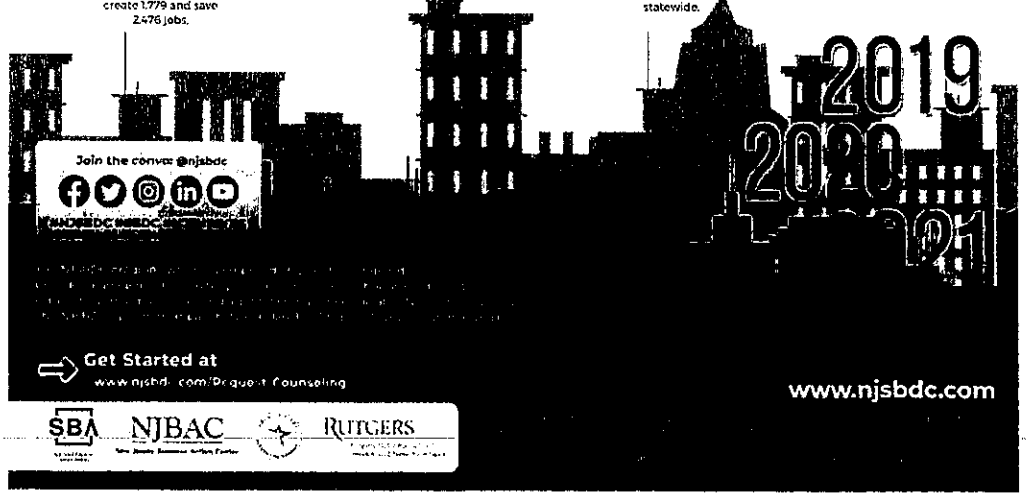
4,255 — JOBS SUPPORTED
NJSBDC supported 4,255 jobs by helping small business and clients create 1,779 and save 2,476 jobs.

5,166 — LONG-TERM CLIENTS
NJSBDC clients received 5+ hours of expert business counseling

1,188 — HIGH GROWTH CLIENTS
1,188 clients of the NJSBDC were considered as high-growth.

2,198 — TRAINING EVENTS
The NJSBDC sponsored 2,198 training session statewide.

38,219 — TRAINING EVENTS ATTENDED
38,219 attendees attended training seminars (on various business development topics).



SBA NJBAC RUTGERS

Saint Peter's University

98x

Saint Peter's UNIVERSITY

1872-2022

OPPORTUNITY FOR GENERATIONS

Ignite Institute

Sparking Innovation for 21st Century Social and Economic Justice

The Ignite Institute, a Center of Excellence at Saint Peter's University, sparks the spirit of entrepreneurship through education, business planning, community-partnered programs and research both on campus and regionally. It positively impacts local economic development as a hub for entrepreneurial empowerment and thought leadership for public, private and nonprofit stakeholders.

The Ignite Institute was founded in 2014 in partnership with Rising Tide Capital.

Carlos Miguel Gutierrez, Jr., J.D.
Executive Director, Ignite Institute

Chanaz Gargouri, Ph.D., M.B.A.
Assistant Professor, Department of Business Administration
Coordinator, Jersey City Urban Entrepreneur Project

Mary Kate Naatus, Ph.D.
Dean, School of Business

99x

Local Economy Strategic Partners

100x

Programs

Microbusiness Consulting Program

Saint Peter's students gain real-life experience assisting small, local businesses in a variety of roles. This innovative, interdisciplinary program allows students to network, develop and strengthen skills and help foster relationships with fellow entrepreneurs.

Innovation Fellows Program

Paid internships are awarded to high performing students in various majors to assist local micro-businesses and organizations with relevant projects, with a focus on strengthening the businesses and enhancing growth. Students are able to learn a variety of skills while making a positive impact on the local community.

Local Living Economy Summit

This much anticipated annual event gives students the opportunity to be among a diverse number of local entrepreneurs, philanthropists, advocacy groups and nonprofits, business leaders and policy makers to generate solutions to economic development issues and address the challenges faced by local business owners and entrepreneurs.

On-Campus Training Opportunities

Throughout the year, the Institute offers engaging workshops and training that are dedicated to strengthening the necessary skills and knowledge students will need to be career-ready upon entering the workforce and business world.

Town and Gown Project

In a dynamic partnership with the Hudson County Chamber of Commerce, Saint Peter's features the annual Senior Business Student Consulting Town and Gown Project. This collaborative business seminar provides consulting experience to students, while also providing valuable insights to owners of small businesses.

Student-Driven Activities

Students join local vendors as fellow
business owners during student-driven sales and expos on campus during the school year. In addition to supporting local businesses, students are empowered and learn how to build their brands and sales skills.

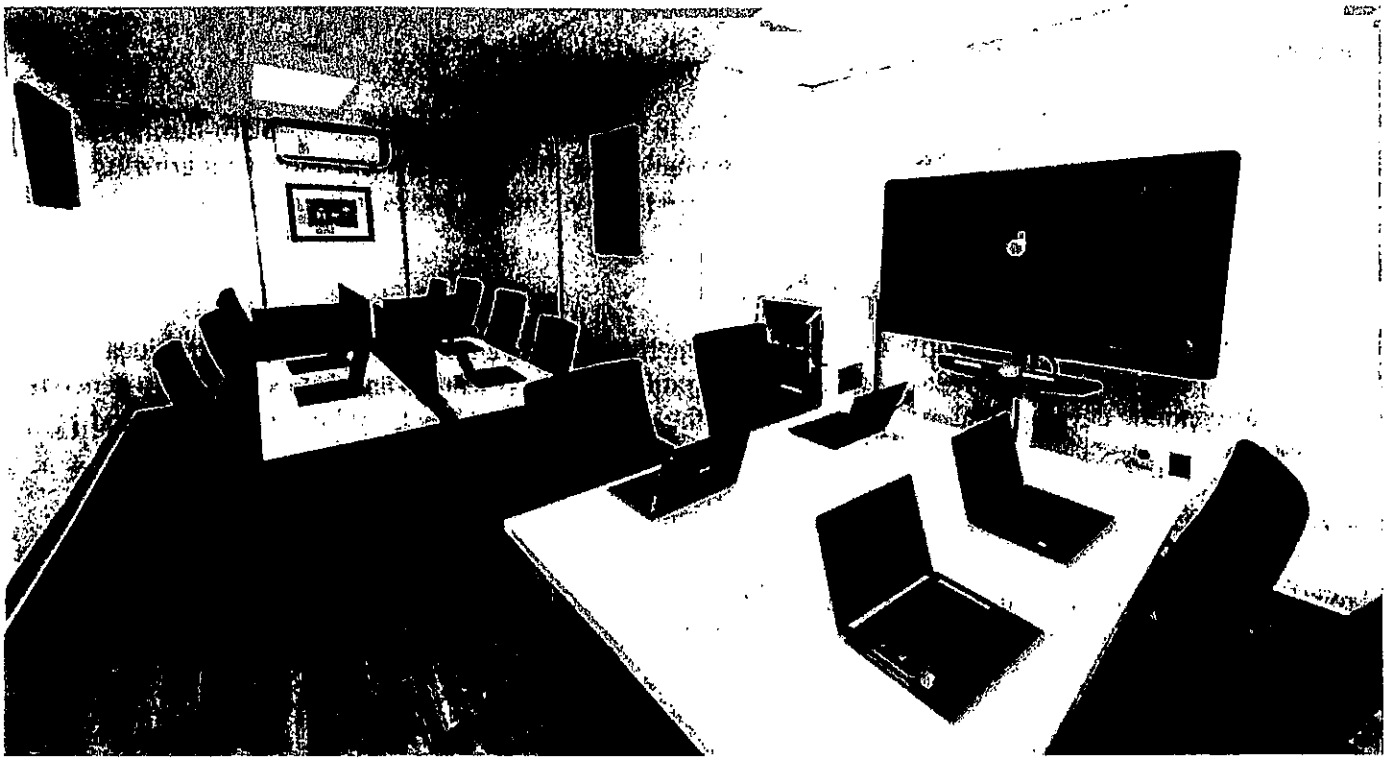
Entrepreneur in Residence Program

The Entrepreneur in Residence (EIR) program provides mentorship and expertise from experienced entrepreneurs and business professionals for Saint Peter's students. The monthly EIR lunch series includes workshops and hands on training in digital marketing, sales, business plans, budgeting and other key steps in starting and growing a business. The program partners with SCORE mentors and is funded by Investors Bank.

The Ignite Institute strives to develop more strategic partnerships while serving as a resource to the local community. Interested in developing a partnership with The Ignite Institute? Contact ignite@saintpeters.edu.

Social Impact Incubator

Our Social Impact Incubator was launched in 2021 with the support of the Provident Bank Foundation. Its purpose is to help build capacity of local Jersey City and Hudson County businesses, especially social impact enterprises and nonprofit organizations. Available resources include shared space for entrepreneurs, access to Laptop computers and pre-loaded software, internet and Wi-Fi access and other tools.



Social Impact Incubator Conference Room

In addition, on a limited basis Incubator clients can request student interns, consulting project support from student teams and faculty and access to conference and huddle rooms and training venues.

Social Impact Incubator at Saint Peter's University's Ignite Institute Named in Recognition of the Provident Bank Foundation

Research

Community Engagement on campus: Experiential Learning in Digital Marketing-A Library Social Media Takeover
by Daisy Decoster and Mary Kate Naatus

A Proposal for Worker Cooperatives in Jersey City: A community-impact, student-led research project
led by Dr. Donal Malone

International Journal of Social Entrepreneurship and Innovation, Vol. 3, No. 5, 2015
"In defence of the neighbourhood: understanding micro-business entrepreneurship, embeddedness and social capital as a means to community well-being" by Alex Trillo and Mary Kate Naatus

New York University 12th Social Entrepreneurship Conference Proceedings, October 2015
Students as Social Entrepreneur Change Agents: Community based research and learning By: Mary Kate Naatus, Alex Trillo, Michael Caslin

21st Annual International Association of Jesuit Business Schools Conference Proceedings, July, 2015
Building Bridges in the Urban Local Economy: a Jesuit University – Non-Profit Partnership Model By: Mary Kate Naatus- Saint Peter's University, Michael Caslin, Alfa Demmellash- Rising Tide Capital, Aleksandra Lacka- Researcher, & Kim Zeuli-ICIC

Drew University

104x

RISE Talk: "The Discovery of Paxlovid for the treatment of Covid-19 patients"

Speaker: Dr. Dafydd Owen, Senior Scientific Director, Medicinal Chemistry, Pfizer
Monday Nov. 14th 2022, 7pm

One-of-a-kind science research program

In our RISE program, science students study with star researchers like **Drew Fellow and 2015 Nobel Prize Winner William Campbell**, as well as other industrial scientists who come to Drew from industry leaders like AT&T Bell Labs, Bristol Myers Squibb, Sanofi, Merck and Schering-Plough. With decades of leadership in biology, chemistry, mathematics and physics, these researchers work one-on-one with Drew undergraduate students, mentoring and guiding them as they perform hands-on research.

See what some of our recent grads are doing now, and how RISE helped them get there.

Vanessa Raab C'21

"Going into the biotech field has proven that Drew provides amazing lab experience."

Vanessa is a research assistant in Shenandoah Biotechnology's molecular biology department.

Erin Connors C'18

"RISE was an opportunity of a lifetime."

Erin is a PhD student in Ohio State's Biomedical Sciences Graduate Program.

Benjamin Strickland C'21

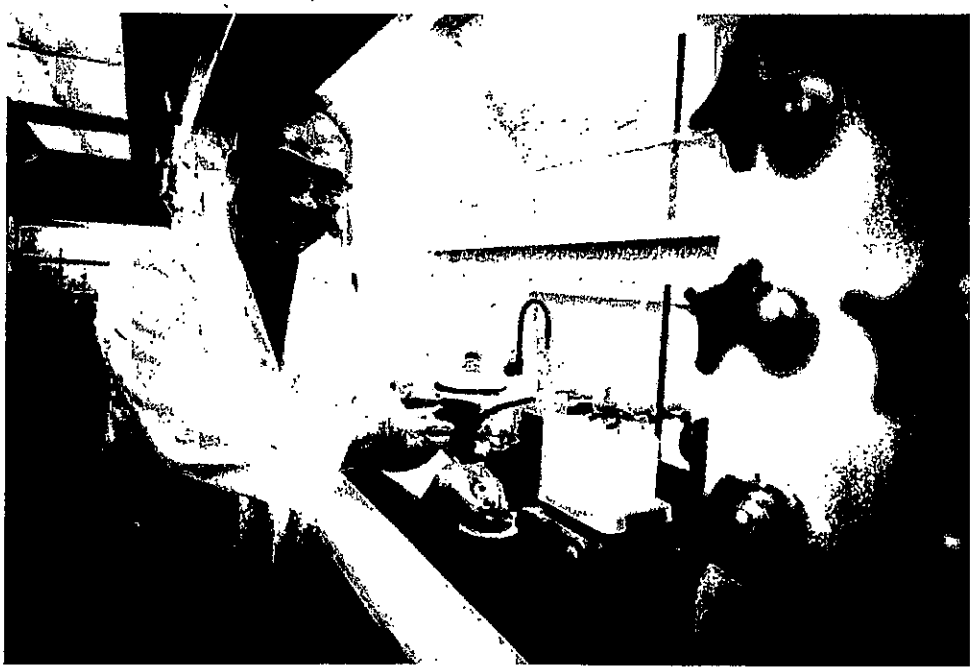
"The first-hand experiences in RISE are paramount in helping students find success in their post-Drew careers."

Benjamin is a PhD student in UNC-Chapel Hill's Chemical Biology and Medicinal Chemistry program

Makayla Pardo C'20

I learned how to be a good scientist."

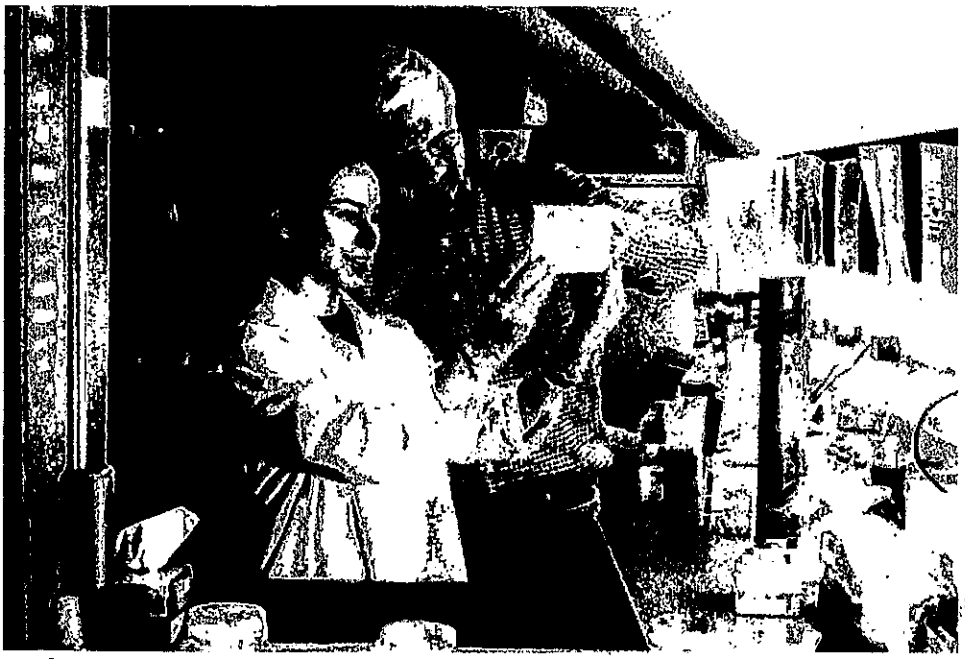
Makayla is a PhD student in Brown University's Pathobiology Program.



Junhui Huang C'20

"I think the key takeaway from the RISE lab is that research is fun to do!"

Junhui is a student in Columbia's applied math bachelors of science program.



Stefanie DeFronzo C'20

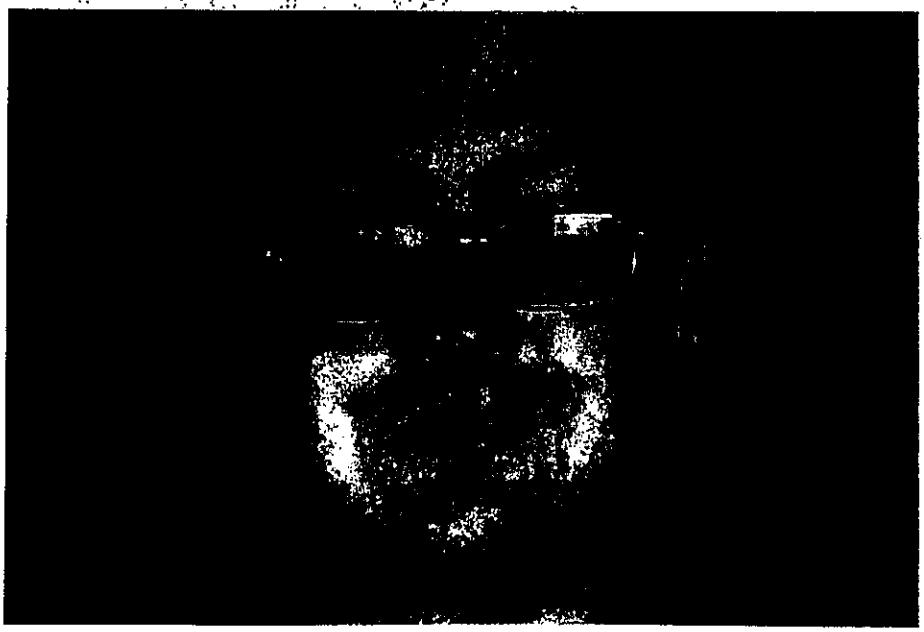
"With ample connections to the science world from their time in the industry, the RISE fellows always make a point to market their students and teach them how to be proactive in gaining opportunities and experiences."

Stefanie is a research associate at Mount Sinai Hospital in New York City.

Jillian Scarpanito C'20

"RISE gave me my own experiment, my own work, something to be proud of and talk about during interviews."

Jillian is a Doctor of Optometry student in the Massachusetts College of Pharmacy and Health Sciences.



Lloyd Goldstein C'20

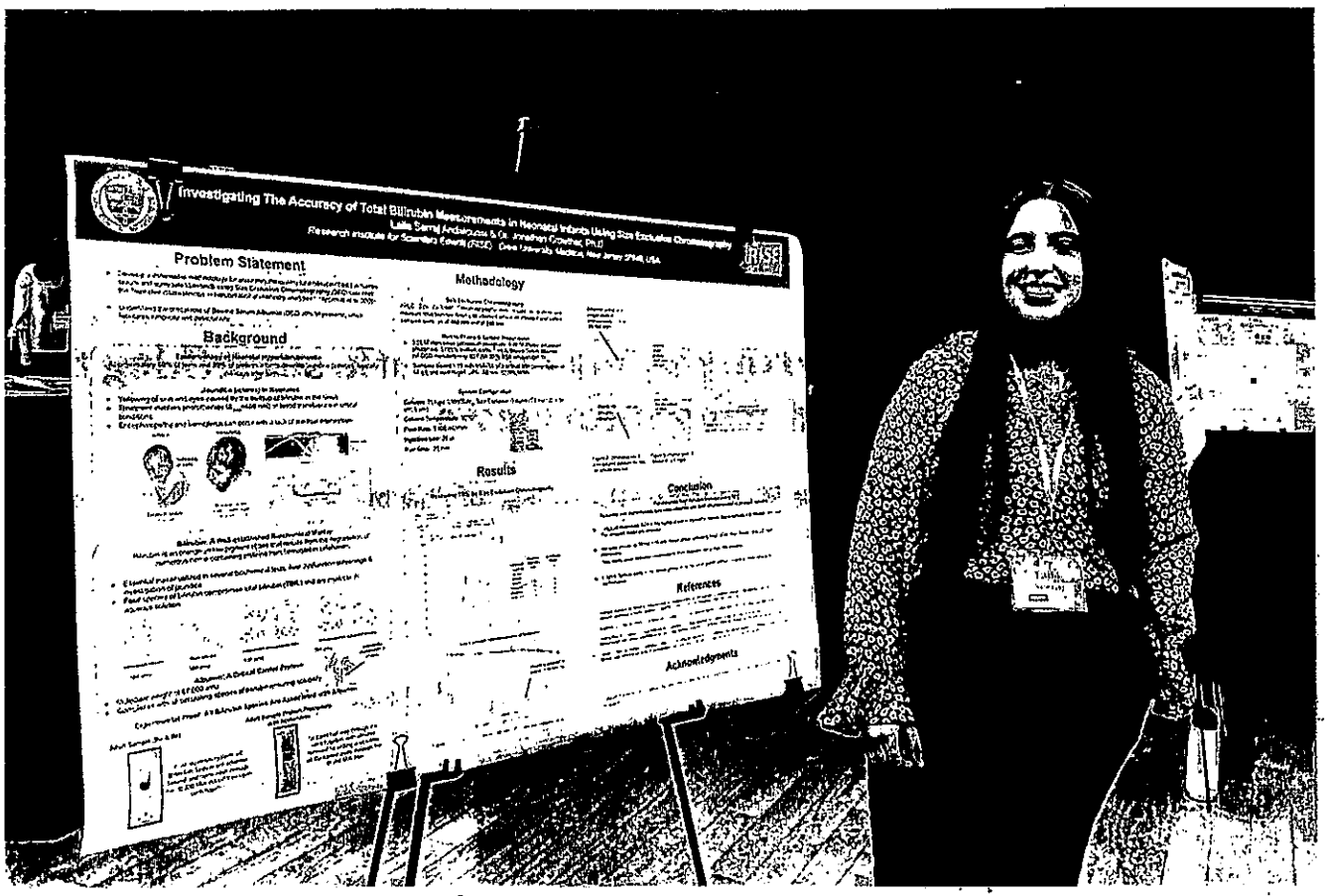
"Getting experience with RISE and other independent research opportunities was really important in preparing me for grad school."

Lloyd is a statistics PhD student at The Ohio State University

Drew University Students Tout Hands-On Research Experiences in

October 2022 – Drew University's RISE program, which pairs undergraduate science students with retired industry professionals in the research lab, is a hit among students.

We asked why RISE was so impactful for participating students in gaining skills, confidence, and valuable experience to put on a résumé or grad school application.



Serraj, presenting her RISE research.

Unique hands-on experience

"My RISE experience has been one of the most valuable opportunities at Drew," said Laila Serraj C'23, a biochemistry and molecular biology major (BS) and psychology minor. "The past year in Dr. (Jonathan) Crowther's lab has helped me develop my critical thinking, interpretation, and written/oral skills. I have also expanded both my analytical and instrumental chemistry skills beyond the classroom through hands-on lab experience. As an aspiring physician, I am certain that these skills will allow me to confidently succeed in medical school."

"RISE gave me a lot of hands-on experience, which will help me in graduate school and also my prospective career as a research scientist," added Hrishi Pal C'23, a biology (BS) major and biochemistry and public health double minor. "I have gained some valuable skills such as pipetting, plating, and aseptic technique skills, which I wouldn't have learned in the classroom."

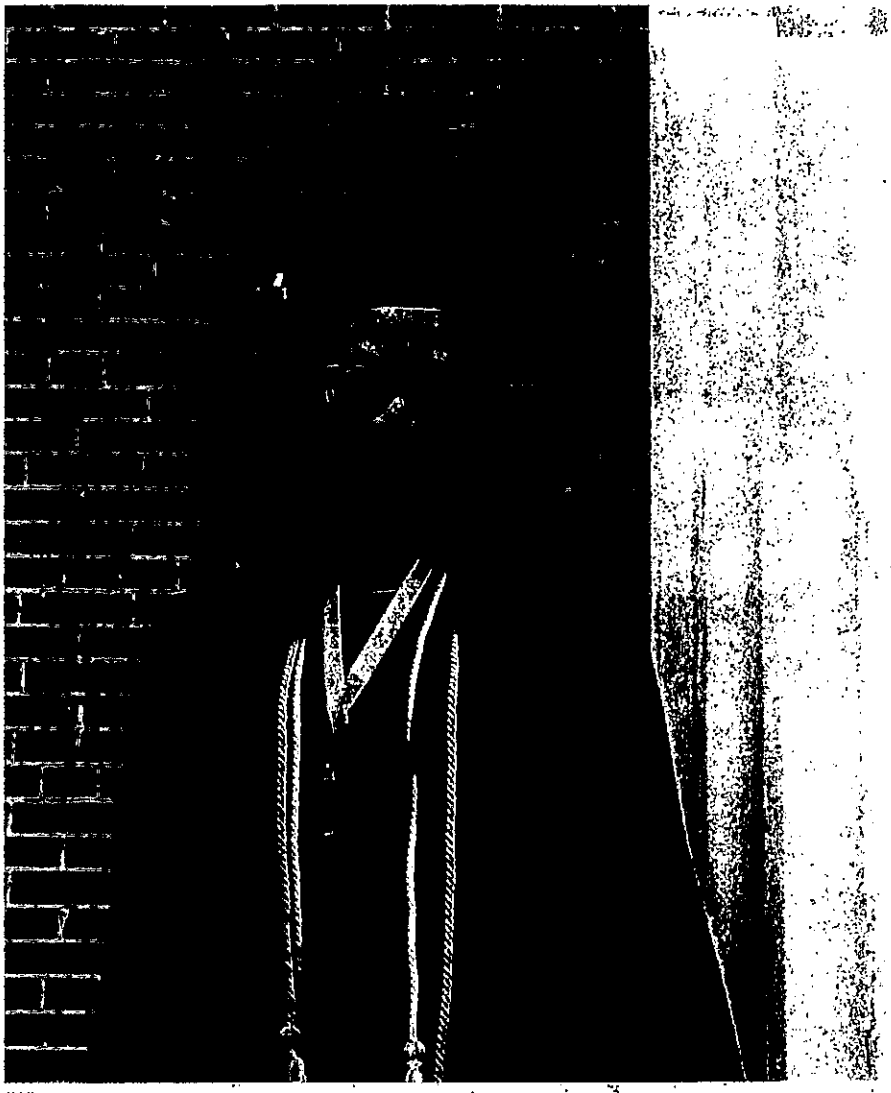
110x

Solomon, with a copy of Drew's research journal containing her RISE seminar paper.

A transformative experience

"RISE was crucial in setting me on the path I'm on today," said Grace Solomon C'24, a biochemistry and molecular biology (BS) major and neuroscience minor. "It was truly a transformative experience. I came into the lab with less experience than most, having done the majority of my first year online during the pandemic, but I learned so many different techniques and my confidence in the laboratory grew exponentially. The most valuable aspect was just getting to talk with the RISE fellows about how things work in the real world and what kinds of experiences they had as industry scientists."

Solomon is looking to pursue a PhD in molecular biology and a career in biomedical research or drug discovery. RISE will give her a launchpad for achieving those goals.



Wang

"When I first started doing research, the perseverance that's necessary for science didn't come naturally to me," she said. "I needed a lot of help to effectively troubleshoot my experiments and interpret what my results actually meant. The RISE fellows were incredibly patient with me and I'm so grateful to have recognized and faced that issue, especially before applying to graduate schools. I'm now very comfortable in a lab setting and am confident enough in my skills that I can see a future in the field, which, as a woman in STEM, is not always an easy thing."

Recent grads are proof of RISE's impact

Stephanie Wang C'22, a neuroscience (BS) major and history minor, is now a predoctoral research associate in Lehigh University's biology department.

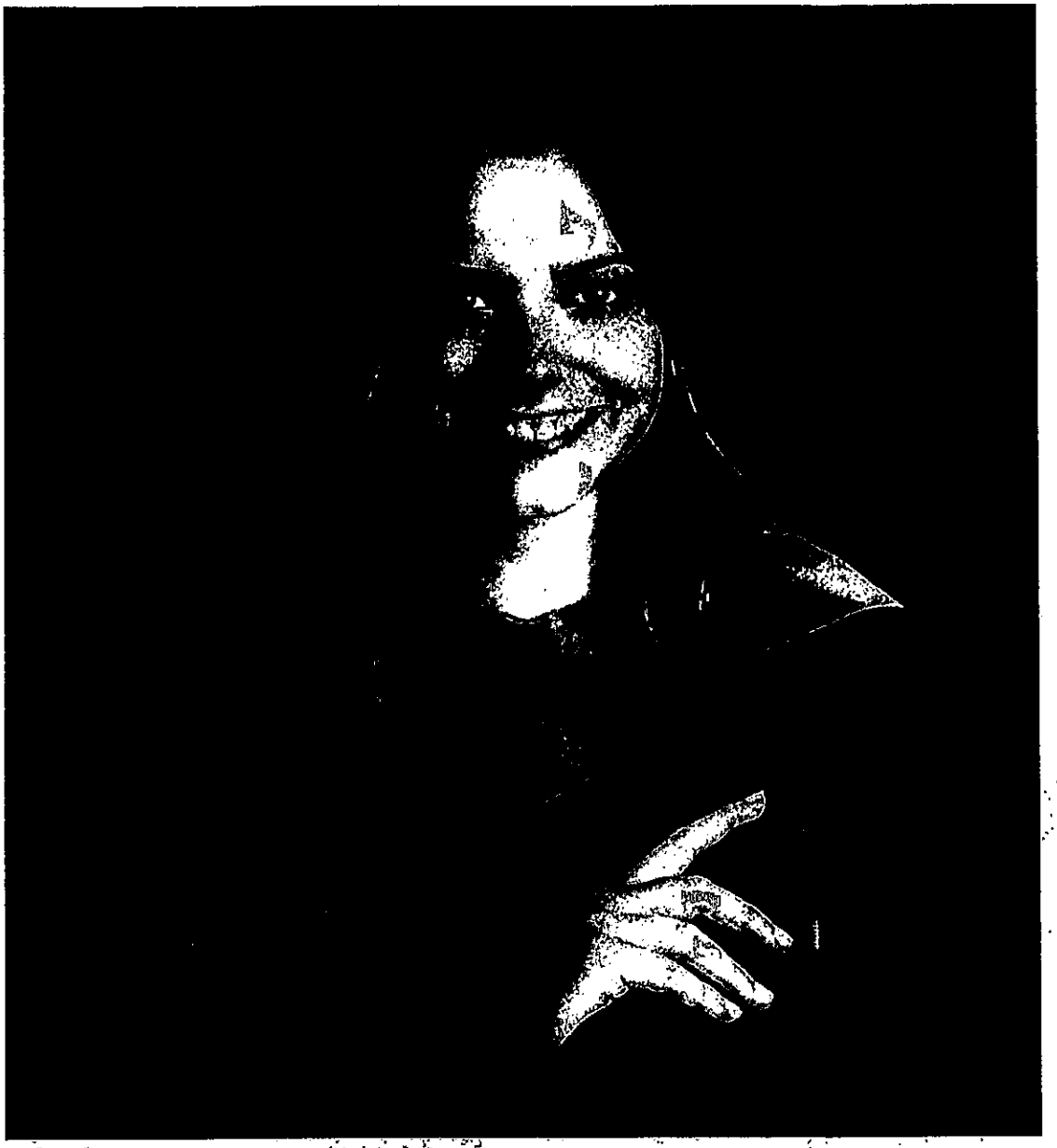
"RISE and my mentor Dr. Marvin Bayne were instrumental to my success both at Drew and beyond," she said. "I was supported all the way through. Without the training and experience with Dr. Bayne and Drew in general, I would never have had the confidence to apply for my job or explore different career paths like attending medical school, doing industry research, considering a PhD, or other jobs in the science field."

Patel

Krishna Patel C'22, a biochemistry and molecular biology (BS) major and psychology minor, plans on attending medical school and currently works as an applied behavioral analysis therapist for neurodiverse children.

"RISE fellows provided such insightful advice as I was beginning to navigate the world outside of Drew and out of academia," she said. "I was able to learn laboratory techniques and think analytically. I developed independence and confidence in my abilities. I was able to build a network and a support system that allowed me to apply to a variety of jobs as a senior. These are all qualities I will continue to practice as a medical student in the near future."

113x



Miltiadous

"I apply the skills and knowledge that I acquired during my RISE research experience on a daily basis," said Christianna Miltiadous C'22, a biology (BS) major and neuroscience minor who is now working as a medical assistant in nephrology with plans on attending medical school.

"I learned how to conduct research and how to overcome challenges and move forward when experiments didn't go as planned. I developed skills such as critical thinking and problem solving, as well as the ability to communicate effectively with others. I also acquired certain characteristics that I believe to be critical in becoming a successful physician including resilience, patience, determination, and the eagerness to learn."

CONTACT

ALISON GILBERT
DIRECTOR, CENTER FOR ENTREPRENEURSHIP
AGILBERT@MONMOUTH.EDU

5. Providing access to capital.

ORGANIZING A MIXTURE OF FINANCIAL RESOURCES TO SUPPORT AND INVEST IN UNIVERSITY AND REGIONAL NEW JERSEY ENTREPRENEURIAL PROJECTS.

116x

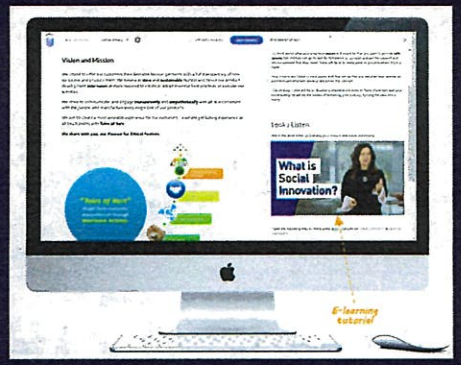
4. Offering entrepreneurial skill-building experiences and business creation resources.

WE OFFER LEARNING PROGRAMS, EVENTS AND A LIBRARY OF RESOURCES THAT HELP STARTUPS CULTIVATE ENTREPRENEURIAL SKILLS, AN ENTREPRENEURIAL MINDSET, AND MOVE THROUGH ALL THE STEPS TO GO FROM IDEA TO VIABLE PRODUCT—AND BEYOND.

WORKSHOPS

GUEST SPEAKERS & MENTOR SUPPORT

1:1 COACHING



SELF-GUIDED LEARNING

117x

3. Hosting pitch competitions for the university and regional startup communities.

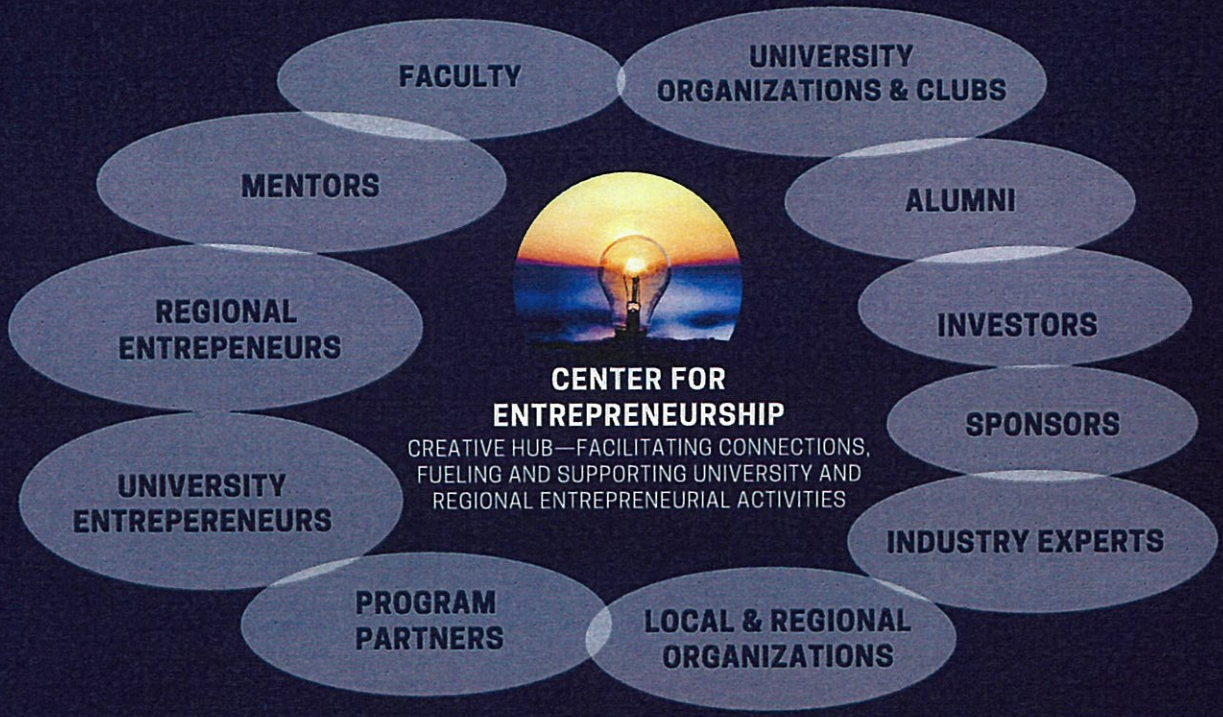
NETWORKING OPPORTUNITIES, EXPOSURE, ACCESS TO CAPITAL AND MENTORSHIP.

CENTER FOR ENTREPRENEURSHIP AT MONMOUTH UNIVERSITY | 2022-2023 & BEYOND

118x

2. Cultivating a network of mentors, faculty, industry experts, alumni, investors and program partners.

TO DRIVE INNOVATION AND SUPPORT NJ AND UNIVERSITY ENTREPRENEURIAL COMMUNITIES.



119x

1. Creating a physical space

WE ARE SETTING UP A FLEXIBLE PHYSICAL SPACE—FOR CO-WORKING, MEETINGS, CLASSES, WORKSHOPS, COACHING AND EVENTS—TO INSPIRE ENTREPRENEURIAL CREATIVITY AND ENCOURAGE IDEATION AND COLLABORATION.

120x

How we are fueling innovation and the startup ecosystem in New Jersey

CENTER FOR ENTREPRENEURSHIP AT MONMOUTH UNIVERSITY | 2022-2023 & BEYOND

121x

Our Strategic Focus Areas

1. ECOSYSTEM DEVELOPMENT

IT TAKES A DIVERSE ECOSYSTEM TO BRING ENTREPRENEURIAL ENDEAVORS TO LIFE. WE'RE HERE TO NURTURE AND FACILITATE THE CROSS POLLINATING OF IDEAS, RESOURCES, CONNECTIONS AND PARTNERSHIPS AMONGST THE UNIVERSITY AND REGIONAL COMMUNITIES.

2. ENTREPRENEURIAL SKILL-BUILDING

EVERYONE HAS ENTREPRENEURIAL SKILLS. THE CENTER FOR ENTREPRENEURSHIP IS HERE TO HELP AS MANY AS WE CAN IN THE MONMOUTH UNIVERSITY AND REGIONAL COMMUNITY—DISCOVER AND APPLY THEIR ENTREPRENEURIAL POTENTIAL PROFESSIONALLY OR IN BUSINESS-BUILDING.

WE EXIST TO HELP THE **(UNIVERSITY COMMUNITY) (TAP INTO)** AND FULFILL THEIR **(ENTREPRENEURIAL POTENTIAL).**

3. BUSINESS CREATION

WE HELP BUSINESSES GET OFF THE GROUND AND SUCCESSFULLY GROW. OUR PROGRAMMING IS DESIGNED TO MEET INDIVIDUALS AT EACH PHASE OF THE ENTREPRENEURIAL JOURNEY AND HELP THEM GO FROM IDEA, TO VIABLE PRODUCT, TO TRACTION AND BEYOND.

122x

Our Mission

TO HELP THE MONMOUTH UNIVERSITY AND REGIONAL NJ STARTUP COMMUNITIES—TAP INTO AND FULFILL THEIR ENTREPRENEURIAL POTENTIAL.

123x

Executive Summary Overview

MISSION

STRATEGIC FOCUS

HOW WE ARE FUELING INNOVATION AND THE STARTUP ECOSYSTEM IN NEW JERSEY

CENTER FOR ENTREPRENEURSHIP AT MONMOUTH UNIVERSITY | 2022-2023 & BEYOND

124x


THE BEST WAY TO
PREDICT THE FUTURE IS
TO CREATE IT.
- ABRAHAM LINCOLN

125x

EXECUTIVE SUMMARY BY ALISON GILBERT

Center for Entrepreneurship 2022-2023 & Beyond

INSPIRE IGNITE IMPACT

MONMOUTH UNIVERSITY

126x

RUTGERS
Office for Research

Michael E. Zwick, Ph.D.
Senior Vice President
Rutgers, The State University of New Jersey
33 Knightsbridge Road, 2nd Floor East
Piscataway, NJ 08854

research.rutgers.edu
michael.zwick@rutgers.edu
p. 848-932-2440
f. 732-932-0146

Good afternoon. I want to thank Chairman Tully for inviting me to testify before the Assembly Science, Innovation, and Technology Committee concerning innovation and start-up ecosystems in New Jersey. My name is Mike Zwick, and I have served as the Senior Vice President for Research at Rutgers University since September 2021. As you may be aware, Rutgers, The State University of New Jersey, is a large institution composed of three geographic campuses: Rutgers-Camden, Rutgers-Newark, Rutgers-New Brunswick, and Rutgers Biomedical and Health Sciences. We impact every county in the state of New Jersey. When I speak about Rutgers, I first like to share our values as communicated eloquently by our President, Jonathan Holloway. We seek to build a beloved community that embraces our diversity and is inclusive in everything we undertake. We relentlessly pursue academic excellence in our educational and research activities. And we seek to bring strategic clarity to a large and diverse institution. This is not only to benefit our students and faculty. We also strive to make Rutgers more easily accessed and understood by the people of New Jersey, who, as a land-grant institution, we are duty-bound to serve.

Rutgers research enterprise, which is foundational to New Jersey's innovation and start-up ecosystem, is strong and growing. Last year, 1595 different Rutgers principal investigators received 4,176 sponsored awards. In total, Rutgers received $872.8 million in sponsored funding. Of note, our funding for biomedical research from the National Institutes of Health was $241.4 million in FY22 and has grown by 25% over the last two years and 56% in the previous five years. These federal dollars support research employment on our campuses, state workforce development, and support for New Jersey businesses. The Office for Research's Innovation Ventures team moves Rutgers innovations from discovery to the market. They manage approximately 1300 technologies and 2900 patents, have supported 96 active startup companies, and oversee 852 licenses to external companies. Our diverse products include diagnostic tests for COVID, therapeutic development for human diseases, graphene

technology, underwater drones, cement technology, recycled railroad ties, and agricultural products like cranberries and turf grass. Each of these research activities strengthens Rutgers' student-facing academic programs and helps prepare our students for the careers of tomorrow. A strong state university with growing external funding can pursue high-risk research that leads to discoveries essential for a vibrant innovation and start-up ecosystem.

My career path before joining Rutgers University was a bit unusual. I arrived from Emory University in Atlanta, GA, where I was a tenured Professor of Human Genetics and held several senior administrative titles. That is not unusual for an academic. What is unusual is that I am a former surface warfare qualified officer in the United States Navy and retired as a Commander (O-5) in June 2017 with 25 years of service. I served onboard the USS KAUFFMAN (FFG 59) out of Newport, Rhode Island, am a veteran of Desert Storm, and was recalled for active duty to support the Iraq and Afghanistan war efforts from November 2002 through November 2004. These collective experiences inform my leadership of the Rutgers Office for Research. First, I seek to understand whom we serve. At Rutgers, we serve our students, our outstanding faculty, our patients through Rutgers Healthcare, our 500,000 alums, and ultimately the people of New Jersey. Rutgers, the State University of New Jersey, is more than a name. It is a mission. Second, I seek strategic clarity in our activities supporting innovation and how we communicate. Finally, much as I did as a scientist, I pursue experimentation. We can only improve as an organization if we perform carefully designed experiments, take calculated chances, and measure our outcomes.

Applying these ideas to develop an exciting innovation and start-up ecosystem in New Jersey suggests strategies we might pursue together. We want a system where entrepreneurs are empowered to take risks. Because entrepreneurship is risky, we should seek creative opportunities to help more succeed. Connecting, mentoring, and supporting entrepreneurial individuals with diverse backgrounds is

key to a stronger New Jersey. This is something we at Rutgers have done and can do effectively and efficiently. For example, Andrew Brooks, who led RUCDR Infinite Biologics, a part of Rutgers Human Genetics Institute of New Jersey, developed the first FDA-approved saliva test for the SARS-CoV-2 coronavirus. RUCDR Infinite Biologics was subsequently spun out as a private company in New Jersey, now named Sampled. While government should never get into the business of picking entrepreneurial winners and losers, it can support institutions like Rutgers University that act as thoughtful incubators of talented and promising innovators.

When faced with a complex challenge, such as supporting an exciting innovation and start-up ecosystem in New Jersey, I seek to identify force multipliers. What are force multipliers? Force multipliers are attributes of an organization that enable the successful completion of multiple essential missions. I first became aware of this idea during my service in the United States Navy. I want to share a short anecdote that exemplifies this concept. During Desert Storm, I was a communications officer onboard the USS KAUFFMAN. We received this new technology called GPS, that at the time was encrypted but allowed us to know our location on the earth with tremendous accuracy. At the time, this capability allowed the Navy to carry out many missions effectively. In my case, it allowed us to escort ships through the minefield outside of Kuwait City. Today GPS is in our phones and watches and has become foundational to how we travel and live our lives. The potential for GPS as a force multiplier was clear then, and it continues to be a force multiplier.

What are some possible force multipliers at Rutgers that can help further develop New Jersey's innovation and start-up ecosystem? I wish to suggest two major ongoing activities that could be expanded and help catalyze future public-private partnerships. The first is Rutgers Core Services. Core Services are specialized research platforms operated as fee-for-service businesses, usually capital-intensive, that support the cutting-edge research essential for an innovation and start-up ecosystem.

Many investigators need access to these platforms, but not a single investigator can fully utilize them. They also provide critical training to our students, support our academic mission, and provide employment for technical experts who manage and run vital equipment.

Since I arrived at Rutgers, we have sought to make these core services broadly available to New Jersey entrepreneurs. Further supporting this initiative, the Commission on Science, Innovation, and Technology (CSIT) began offering companies $25,000 grants to use core services found at Rutgers and other universities in New Jersey. Initial demand has been high and increasing funding for this program could provide much-needed support to the innovation and start-up ecosystem. Providing access to cutting-edge platforms can be the difference between success and failure for a start-up company. Given these initial successes, the state of New Jersey, through CSIT for example, could provide further support to institutions applying for federal equipment grants to the platforms located within core service facilities. Providing 10% of the cost of a platform for five years could be expected to help our faculty investigators obtain the other 90% of the funding from the federal government for equipment purchase, with the remaining subsidy provided by the institution for managing the core services facility. This is an innovative force multiplier and not something other states are doing, but it could support innovation and start-ups in New Jersey.

Supporting early-stage start-ups and reducing the failure of these endeavors can be aided by obtaining federal SBIR/STTR grant funding. Existing programs within the NJEDA and CSIT also support these goals and are worthy of continued support. But many fledgling companies need help to be competitive for such funding. At Rutgers, our Tech Advance and Health Advance programs are designed to provide funding for faculty startups to generate critical data necessary for a successful launch. Increasing funding for these activities in New Jersey could again be a game-changer. These programs

could be managed state-wide by the NJEDA or CSIT and would help strengthen the linkages between public universities and our New Jersey innovators and entrepreneurs.

New Jersey is poised to become an innovation leader. We have a diverse population with a vast pool of college graduates and top-level talent, a top 20 research university with a medical school, a soon-to-be-built innovation hub in New Brunswick, and a robust life sciences ecosystem with many of the leading pharmaceutical companies in the world calling New Jersey home. The future of innovation suggests a growing, inclusive, and dynamic partnership between innovators, entrepreneurs, industry, investors, Universities, and the public sector. New Jersey should lead the way in creating and nurturing the environment that will encourage such public-private partnerships. Improving our core services and enhancing financial and mentoring support for start-ups are concrete actions we can take today to help us realize this vision. As an educator, public servant, scientist, and citizen of the great State of New Jersey, I am deeply encouraged by this Committee's leadership. I know that working together, we can help make New Jersey a national, and even global, leader in innovation, new business creation, and economic development.

RUTGERS
Office for Research

ASSEMBLY TESTIMONY
FACT SHEET

I. Core Services Facts

- Provide central funding for faculty use of Rutgers cores.
- NJEDA/CSIT grants
- Animal care facilities and services
- 64 Core services and facilities
- Provide office hours and give presentations about cores at the NJEDA BioScience Center.
- Rutgers cores have won NIH S10 and NSF MRI grants from the federal government to acquire new equipment.

II. **Core Services Opportunities and Support**

- Expand existing CSIT grants program for start-ups to use core service facilities
- Provide a state support for federal equipment grant applications such as NIH-S10 grant applications

III. Innovation Ventures Facts

(numbers below do not include turf grass)

- ~1300 number of technologies
- ~2900 issued patents and patent applications under management
- 96 active startup companies - Faculty (96), Students (?)
- 852 of licenses
- Products on the market that improve lives: Diagnostic tests for COVID, TB, ovarian reserve; Therapeutic products: rare pediatric genetic disorder, lots of other therapeutics under development; graphene technology, underwater drones, cement technology, recycled plastic railroad ties; agricultural products like cranberries and turf grass

Programs that support innovation education

- iCorps
- Road to Commercialization Bootcamp
- HealthAdvance/TechAdvance
- TechTransfer Fellowships
- Services through Innovation Ventures
- Services through the IDEA program
- Business School CTEC, other programs
- Food Innovation Center
- Center for Cardiac Innovation

IV. Innovation Ventures Opportunities and Support

- Mentors, volunteers, knowledgeable advisors
- Funding – seed funding, venture funding, program specific funding similar to what the University of Minnesota is doing with the State of Minnesota by injecting 34.5M into Minnesota's early-stage, venture-backed businesses.

  Website: https://twin-cities.umn.edu/news-events/university-deed-launch-venture-capital-programs

- Spaces and facilities (incubators)
- More dynamic programs (accelerators around a particular theme, i.e. medical devices, physical sciences, engineering)

Assembly Science, Innovation and Technology Committee
November 30, 2022

Testimony of Tony Lowman, Ph.D.
Provost, Rowan University

Good afternoon. I am Tony Lowman, Provost and Senior Vice President of Academic Affairs at Rowan University.

I want to thank this committee and the New Jersey State Legislature for your support of Rowan University and the opportunity to speak to you today on behalf of President Ali Houshmand. As an engineer and innovator myself, I am appreciative of the State's commitment to accessible, affordable higher education and am confident in our ability to transform New Jersey into a destination for research and innovation.

Your belief, investment, and trust in us has resulted in Rowan's growth as a top 100 nationally recognized and third fastest growing public research university in the nation. We are currently a Carnegie classified R2 (high research activity) institution and are on an aggressive pathway to becoming an R1classified university, placing us in the highest tier of research universities in the country. We are one of four schools in the nation to offer both MD and DO medical degree programs. We will be only one of two to offer three medical degree programs once our School of Veterinary Medicine is accredited.

Our recent partnership with Virtua Health to create the Virtua Health College of Medicine & Life Sciences of Rowan University as well as the Rowan-Virtua School of Translational Biomedical Engineering & Sciences has opened new pathways for collaboration that we are eager to explore and the institutions are investing more than $200M for research and innovation in the life sciences.

As a leader in life sciences education and innovation, Rowan is dedicated to expanding our entrepreneurial spirit in the area of research and technology commercialization. With the State's support, we have built the South Jersey Technology Park of Rowan University (SJTP) which houses the Center for Research and Education in Advanced Transportation Engineering Systems (CREATES). Our work has already brought in significant federal funding and will continue to grow.

Through SJTP, we have provided a space for entrepreneurs and industry to collaborate with the University on research and development, launch new products, and start new businesses. Our technology commercialization office, faculty, and students provide the pipeline of talent and expertise to these young technology-based companies. Additional resources are readily available through Rowan's nationally recognized School of Innovation & Entrepreneurship within the Rohrer College of Business, an entity designed to further opportunities for professional start-ups and a cross-campus entrepreneurial mindset.

In evaluating the startup ecosystem in the region, we realized the need for more investment and funding. The result was the creation of the Rowan Innovation Venture Fund (RIVF), a University-based, $25 million private-equity fund. The Rowan University Foundation established RIVF with a $5M investment in 2014 to provide early-stage funding primarily to students, faculty, staff, alumni, and South Jersey individuals and companies that have developed and tested projects and products that are ready to compete in the marketplace. In 2022, the Foundation invested an additional $20M, reflecting Rowan University's commitment to stimulating entrepreneurship, advancing research, and supporting economic development in the South Jersey region.

In just 10 years, Rowan has transformed from a respected, regionally ranked, master's classified institution into a research and economic powerhouse. We continue to invest in the University of the Future and the workforce needs of our state and region. On our West Campus, we are developing a collaborative R&D and manufacturing hub and we are in the final design phases for contruction of a life-science focused research center. We are working with environmentally focused companies to harness wind energy, recycle organics, and develop modern food production all while integrating workforce training into these future careers.

This is what Rowan University does. We believe in limitless possibilities. New Jersey has an opportunity to be a model for science, technology, and innovation. Together, we can chart a path for the workforce of the future and drive innovation from the bench to the beside. The need for funding from public and private sources is critical for this ecosystem transformation. With our proven success and increased investment, we can do even more.

Thank you for allowing me to be here today to share our vision with you. I look forward to more discussion on these initiatives.

Background:

There is an overwhelming imbalance of base state appropriations between New Jersey's higher education institutions. The state has established a funding formula to help offset these differentials and provide funding for students that shows commitment to recruitment, retention and on-time graduation of students, especially those from underrepresented groups. With this additional outcomes-based funding, the state's second largest university from an undergraduate FTE count receives more than $1,600 less per student than TCNJ, the second lowest funded institution. Removing that outcomes-based funding, and just looking at base appropriations, Rowan is still the lowest funded university, receiving more than $1,600 less per student than Montclair, the second lowest base appropriation funded university. Rowan receives more than $2,200 less base appropriations per student than the median funding level of State IHE. The following chart demonstrates the imbalance of FY2023 state funding:

FY24 Rowan Base Appropriation Increase Request

FY23 Base Undergraduate Appropriations by Institution

Column Heading	A	B	C	D	E	F
Formula				B+C	D/A	B/A
Institution	FY21 Undergraduate Actual FTE (1)	FY23 Base Appropriations	FY23 Outcome Based Funding	FY23 Undergraduate Appropriations	FY23 Appropriations per FTE	FY23 Base Appropriations per FTE
TESC	N/A	4,561,000	4,967,000	9,528,000	N/A	N/A
NJCU	4,492	24,586,000	7,077,000	31,663,000	7,049	5,473
Rutgers	44,629	240,947,000	44,575,000	285,522,000	6,398	5,399
William Patterson	6,116	29,649,000	8,071,000	37,720,000	6,167	4,848
NJIT	7,516	34,585,000	8,319,000	42,904,000	5,708	4,602
TCNJ	6,942	28,522,000	3,353,000	31,875,000	4,592	4,109
Kean	9,241	37,499,000	11,796,000	49,295,000	5,334	4,058
Ramapo	4,773	18,781,000	3,353,000	22,134,000	4,637	3,935
Stockton	8,498	32,952,000	6,457,000	39,409,000	4,637	3,878
Montclair	14,334	55,480,000	14,776,000	70,256,000	4,901	3,871
Rowan	14,909	32,753,000	11,424,000	44,177,000	2,963	2,197
Total	121,450	540,315,000	124,168,000	664,483,000	5,471	4,449
Total without TESC	121,450	535,754,000	79,593,000	378,961,000	3,120	4,411

(1) Source: Governor's FY 23 Detailed Budget

*Only undergraduate FTE and Appropriations are included in the numbers above

Rowan's Base Appropriations per FTE	2,197
Median Base Appropriations per FTE	4,449
Rowan's shortfall in Base Appropriation per FTE	-2,252

Rowan's shortfall in Base Appropriation per FTE	-2,252
Rowan's Undergraduate FTE	14,909
Additional Undergraduate Base Appropriations Being Requested	$33,575,171

RowanUniversity

DRIVING DISCOVERY, TRANSFORMING TOMORROW

It is my pleasure to welcome you to Rowan University, recognized as the fourth fastest growth public research university in the U.S. in 2022, and invite you to consider the extraordinary opportunities that lie in partnership with our institution and affiliates. This folder provides an overview of the university, with focus on our extensive existing assets as well as the tremendous continued development we envision.

Because of Rowan's consistent institutional strength, independence and capacity, we are an agile and entrepreneurial organization. Our strategic affiliations offer abundant opportunities for new and established endeavors. We have a record of forging powerful partnerships in business, technology, industry and more.

As you become acquainted with Rowan's vast physical, educational and occupational resources, I look forward to developing a shared vision that allows us to drive discovery and transform tomorrow together.

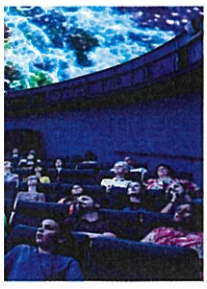
Sincerely,

Ali A. Houshmand, Ph.D.
President

137x

Rowan University

DRIVING DISCOVERY, TRANSFORMING TOMORROW



138x

MORE CAPACITY TO

Rowan University's dramatic and strategic transformation into one of the nation's fastest-growing public research institutions is more important than ever, not just for the University and its 23,000 students, but for all of New Jersey and the countless who rely on Rowan for education, health care, practical research and economic development.

MORE INNOVATION

and ability to solve problems

During the past decade, the University has rapidly transformed into a top-100 public research institution, progressing toward achieving Carnegie R1 status, the designation for U.S. doctoral institutions with the highest research activity. In addition, Rowan is:

- the nation's fourth fastest-growing public research university (the fifth consecutive year of recognition by The Chronicle of Higher Education);
- improving medical and health care professional education with Cooper University Health Care and in a new partnership with Virtua Health;
- managing $40.5 million in FY21 research and sponsored projects (more than $220.63 million since 2016 with sponsors and partners including: DoD, NIH, NSF, Army, NASA, EPA and State of New Jersey);
- host of 24 entrepreneurial companies and three research centers in materials, transportation and virtual reality at South Jersey Technology Park at Rowan University.

139x

ROWAN IS:

TOP 100 PUBLIC RESEARCH UNIVERSITY

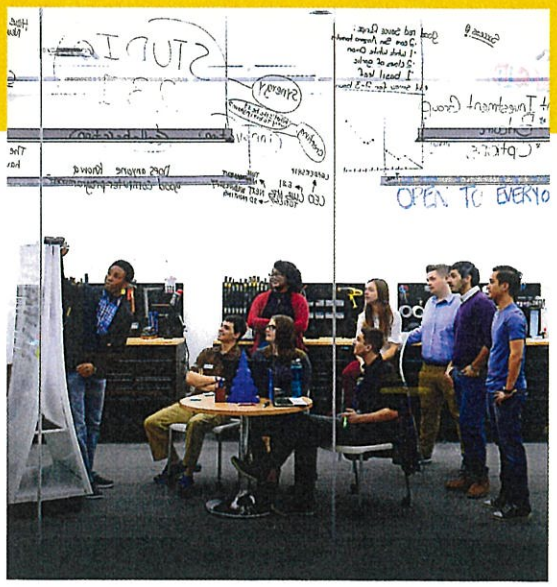
4TH FASTEST-GROWING RESEARCH INSTITUTION, THREE YEARS RUNNING

HEADED TO R1, SOLVING REAL-WORLD PROBLEMS

THE UNIVERSITY OF THE FUTURE: STRATEGIC, SERVICE-MINDED GROWTH

Every day, Rowan University is focused on providing high-quality education at affordable cost so ambitious students can earn degrees, conduct research that addresses real-world challenges and become productive citizens. Our graduates create businesses and produce wealth. As teachers, doctors, scientists, engineers—wherever they work and live and whatever they do—they improve life for all of us.

Ali A. Houshmand, Ph.D.
President



140x

DISCOVER, TRANSF

MORE PATHWAYS

to affordable, valuable degree programs

Rowan continues to expand enrollment to meet the demand for high-quality public higher education throughout its curriculum, particularly in medicine, engineering and business. Even as its research capacity increases, Rowan remains dedicated to excellent undergraduate programs that provide students with the advantages of small classes and the resources of a large university. Enhanced by collaboration and innovation with education partners, Rowan's student-centered focus on access and affordability provides:

- tuition that has been held at or below the predicted rate of inflation for the past eight years;
- more undergraduate enrollment options through our 3+1 programs with community colleges that make a four-year degree more affordable and accessible, at about the same cost that other colleges charge for one year;
- hybrid and fully online degree programs, plus degree completion programs, professional development and stackable credentials through Rowan Global.

MORE CAPACITY

to collaborate with education, health care, corporate and industrial partners

At eight campuses and more than 100 locations, Rowan serves the region and state with access to education, research and essential health care services and programs. Committed to solving real-world problems, Rowan experts and partners are:

- creating and testing new materials and processes to improve the nation's transportation infrastructure, sustainability, biomedical sectors and more;
- conducting research at shared facilities, including the Joint Health Sciences Center in Camden, working with Rutgers–Camden, Camden County College, Cooper University Health Care, Coriell Institute and other Camden-based organizations;
- establishing the Catalysts for Sustainability program to develop, advance and communicate solutions to existential threats posed by the climate and biodiversity crises.

MORE AGILITY

and capacity to respond and transform

Thanks to vigorous commitment to fiscal responsibility within its $587 million operating budget, building public-private partnerships and earning significant support from donors, Rowan University is positioned with unusual agility and resources. Its most recent institutional blueprint, The University of the Future, reflects Rowan's long-standing emphasis on rethinking higher education models and transforming to anticipate and meet needs. Within this context, the University's economic impact and development prospects are significant, including:

- Rowan has undertaken $298 million in capital investments during the past 4.5 years and has more than $209.6 million in capital projects underway and planned for the next five years;
- in addition to direct spending by the University, Rowan affiliates and partners have completed projects closely aligned with the institution, such as the $426 million mixed-use Rowan Boulevard and Inspira's new $350 million hospital. Not calculated as part of Rowan's economic impact, they are just as important, and would not have happened without the University;

141x

RM AND ACHIEVE

- avoiding debt and tuition increases to fund construction, Rowan has built campus facilities through partnerships with host communities, private investors and developers. The public-private partnerships make possible new construction and redevelopment projects designed as resources for the University and the communities it serves;
- a 2019 economic impact analysis by private research firm Econsult Solutions pegged Rowan's impact at $1.53 billion. The University directly supports 4,460 jobs at the institution and nearly 7,000 jobs indirectly in New Jersey each year, making it a major economic development driver in the state and region;
- Rowan students spend an additional $128 million each year throughout the state, beyond tuition, fees, room and board and alumni in New Jersey earn an additional $197 million annually due to their Rowan degrees.

ROWAN CAMPUSES

- **Glassboro**
- **Stratford**
  - School of Osteopathic Medicine
- **Camden**
  - Cooper Medical School of Rowan University
  - Camden Academic Building
  - Joint Health Sciences Center
- **Jean & Ric Edelman Fossil Park of Rowan University** (Mantua)
- **Rowan West Campus** (Mantua)
  - South Jersey Technology Park
  - Athletic complex
- **Rowan College of South Jersey-Gloucester**
- **Rowan College of South Jersey-Cumberland**
- **Rowan College at Burlington County**

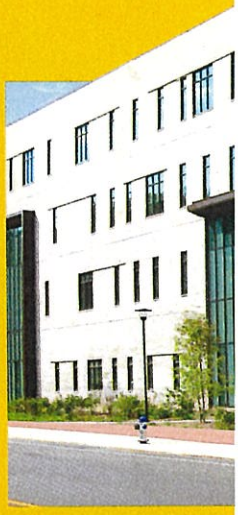
OFF-SITE SERVICES

- **College of Education**
- **Henry M. Rowan College of Engineering**
- **School of Osteopathic Medicine**

142x

In its accreditation review, the Middle States Commission on Higher Education gave Rowan glowing remarks in all areas, stating that Rowan is a "model for institutional transformation."

—Final MSCHE Team Report, 2019



RowanUniversity

OFFICE OF THE PRESIDENT

Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028
rowan.edu

143x

UP21-245/1M

Virtua Health College
of Medicine & Life Sciences
of Rowan University

MAKING HISTORY:
THE FUTURE OF HEALTH CARE

144x

A POWERFUL PARTNERSHIP LIKE NO OTHER

ROWAN UNIVERSITY AND VIRTUA HEALTH FORMED A LANDMARK PARTNERSHIP IN 2021 TO CREATE VIRTUA HEALTH COLLEGE OF MEDICINE & LIFE SCIENCES.

Through the new college and its new and established schools, institutes, centers and clinical practices, both institutions demonstrate their commitment to pioneer an academic health partnership with excellence, empowerment and inclusivity at its core. From the start, these values are guiding the drive to meet critical regional and national demands for health professions education, patient care and research.

This broad, inclusive approach—creating a college within the university to achieve a comprehensive integration of medical, nursing, health and wellness professions education, clinical care and research, from undergraduate through post-doctoral programs—makes the Rowan-Virtua partnership extraordinary.

145x

INNOVATION
BASED ON COLLABORATION

Virtua Health College of Medicine & Life Sciences of Rowan University is a unique academic health partnership between Rowan University, a top 100 public research institution, and Virtua Health, South Jersey's largest health system.

Growing alongside each other for decades, both Rowan and Virtua are leaders in higher education and health care, distinguished in the region and nationally—and destined for more distinction as we work together.

The college begins with the benefit of significant resources invested: an $85 million gift from Virtua Health, one of the largest endowments of its kind at a public university, and $125 million dedicated from Rowan, which will help attract and expand the University's outstanding roster of professionals and students, as well as build facilities on Rowan's West Campus.

The new Virtua Health College encompasses the state's only osteopathic medical school; an expanded nursing and health professions school; a new school of translational biomedical engineering and sciences; multiple centers and institutes; and aligned clinical practices.

Through every phase of education, research and clinical care, Rowan-Virtua professionals will demonstrate our deepened commitment to helping all people live healthier, fuller lives. Our academic health partnership will be a model shaped by our continued devotion to core values—integrity, respect, caring, commitment, teamwork and excellence—that likewise guide our interactions with those we work with and care for.

146x

EDUCATION

EXCELLENCE & ACCESSIBILITY

School of Osteopathic Medicine

With more than four decades of distinction and commitment to excellent medical education and research, the Rowan-Virtua School of Osteopathic Medicine is the state's only osteopathic medical school, with campuses in Stratford and Sewell. Focused on meeting critical needs in primary care, SOM also has established nationally acclaimed programs serving children, older adults and special needs populations and developed master's level and Ph.D. programs through its Graduate School of Biomedical Sciences. As its primary affiliation with Virtua assures that Rowan students will enjoy more clerkships, residencies and fellowship opportunities within the Virtua Health system, SOM will continue collaborating with health systems throughout the region to provide aspiring physicians with clinical experience.

School of Nursing & Health Professions

As Rowan and Virtua Health integrate their well-established education programs and build upon them, the Rowan-Virtua School of Nursing & Health Professions will equip health and wellness professionals and enhance their skills and collaborative capacity to provide care and expertise. Programs include:

- undergraduate and graduate degrees and specialized certificates for nurses
- undergraduate degrees in exercise science, nutrition, public health and wellness, health promotion and wellness management, health studies, and fitness management
- graduate degrees in athletic training, nutrition and dietetics, and wellness and lifestyle management.

School of Translational Biomedical Engineering & Sciences

The Rowan-Virtua partnership promises to further distinguish South Jersey as a regional hub for innovation, research and clinical discovery as it expands through the developing School of Translational Biomedical Engineering & Sciences.

With support from the Virtua Health endowment, the school is recruiting 50 new faculty investigators, including basic and clinician scientists, over the next decade. Three new institutes will research vital concerns in:

- health equity
- cardiovascular disease
- regenerative medicine and transplantation.

Continuing Rowan's commitment to attract, support and develop researchers, the school will welcome students to its teams at every level and throughout its disciplines.

147x

HEALTH CARE

COMMITTED TO PEOPLE

Through their individual organizations, Rowan Medicine and Virtua Health provide multi-disciplinary health care services in South Jersey and at specialized clinical practices throughout the state.

Virtua and Rowan share an overarching commitment to improving the health of New Jersey residents. By creating a new academic health system and collaborating, the partners aim to:

- educate and train the state's next generation of physicians, nurses and allied health professionals
- innovate by researching, developing and testing new therapies, treatments, and models of care
- increase health equity by meeting the needs of the underserved in the region.

About Virtua Health

As the largest health system in South Jersey, Virtua provides care at five hospitals, two satellite emergency departments, more than 30 ambulatory surgery centers and over 400 locations, plus bringing health services directly into communities through home health, rehabilitation, mobile screenings and other outreaches. Its medical specialties include transplant, neuroscience, women's health and cancer. Virtua's various services demonstrate the health system's commitment to the well-being of the community and provide innovative programs that address social challenges affecting health.

About Rowan Medicine

Rowan Medicine serves patients at its main facility on the Stratford campus, as well as at several locations throughout the region. In addition to providing primary care, Rowan Medicine offers 14 specialty areas, including pulmonology, rheumatology, infectious diseases and pain management. Rowan Medicine is known for its several centers with demonstrated excellence in caring for elders, children recovering from abuse and neglect, those with addiction and special needs individuals and their caregivers.

As Rowan Medicine and Virtua Health collaborate and integrate services, they will further establish South Jersey's reputation for superior health care.

148x

RESEARCH

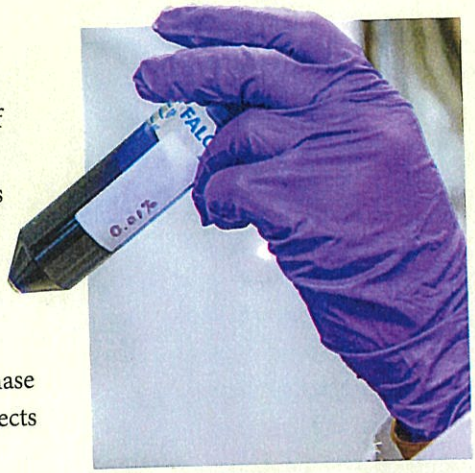
FOCUSED ON DISCOVERY

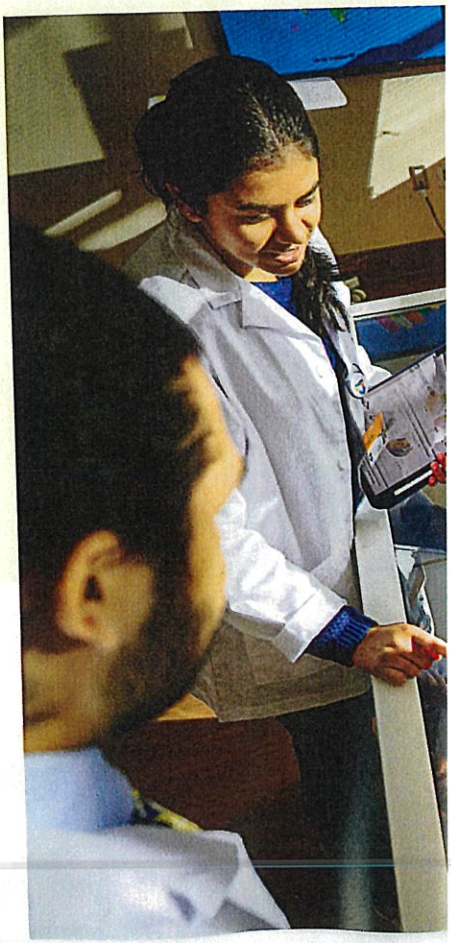
During the past decade, Rowan has rapidly transformed into a top 100 public research institution and the nation's third fastest-growing public research university. In 2018, it earned Carnegie R2 doctoral university classification (high research activity), a distinction shared with just 133 of more than 4,300 higher education institutions.

As its health sciences and biomedical engineering research expand and develop, the Rowan-Virtua partnership will help propel the University toward R1 status, the designation for doctoral institutions with the highest research activity.

Particularly in the Graduate School of Biomedical Sciences and Henry M. Rowan College of Engineering, research has been funded by the National Institutes of Health, National Science Foundation and other prestigious agencies and foundations providing early-stage awards and large, multi-phase funding for major projects. Projects include significant discoveries and progress in novel regenerative biomaterials as well as therapies for neurological disorders including ALS, Parkinson's, Alzheimer's and Canavan diseases, moving toward earlier diagnosis, more effective therapies and improved outcomes for people of all ages.

Already active in cardiac research as a health care system, Virtua's clinical studies continue to expand and advance the industry, including the LEADR program involving a new investigational technology to treat arrhythmia.





149x

Virtua Health College of Medicine & Life Sciences Centers & Institutes

- Child Abuse Research, Education & Service Institute
- Integrated Special Needs Center
- NeuroMusculoskeletal Institute
- New Jersey Institute for Successful Aging
- Cell & Gene Therapy Center
- Institute for Health Equity
- Cardiovascular Institute
- Institute for Regenerative Medicine & Transplantation

150x

In little more than a decade, Rowan University has become a public higher education leader and innovator in medical and health professions training, health care and research. Through our partnership with Virtua Health to create a new academic health system, we are proud to demonstrate even more progress in our commitment.

TOGETHER,

Virtua Health and Rowan University are creating a new learning environment to empower students, health care providers and researchers to improve health and wellness for all.

RowanUniversity
OFFICE OF THE PRESIDENT

Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028

856-256-4100
rowan.edu

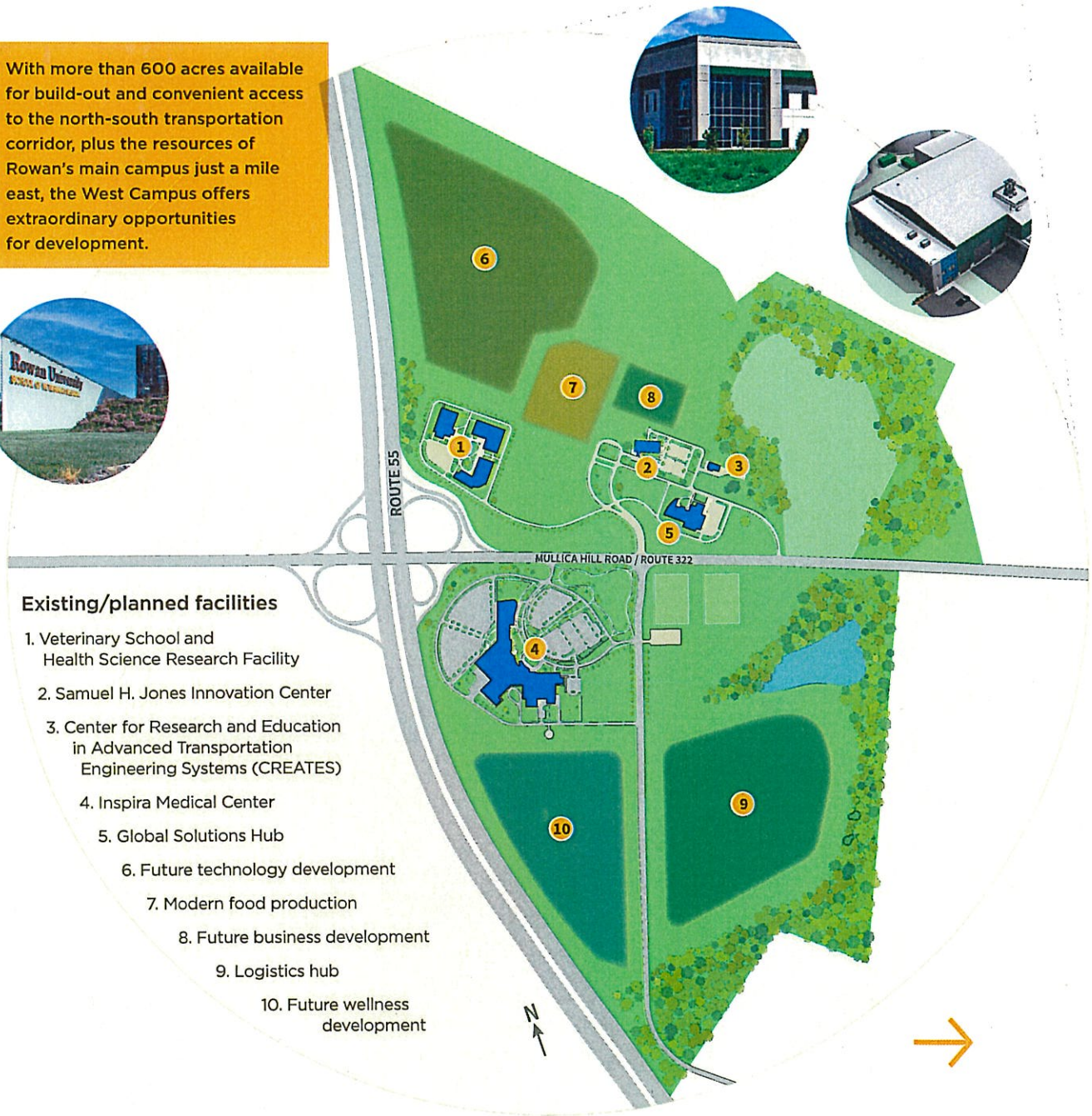
151x

Rowan University

WEST CAMPUS

Conceptual rendering of build-out

With more than 600 acres available for build-out and convenient access to the north-south transportation corridor, plus the resources of Rowan's main campus just a mile east, the West Campus offers extraordinary opportunities for development.



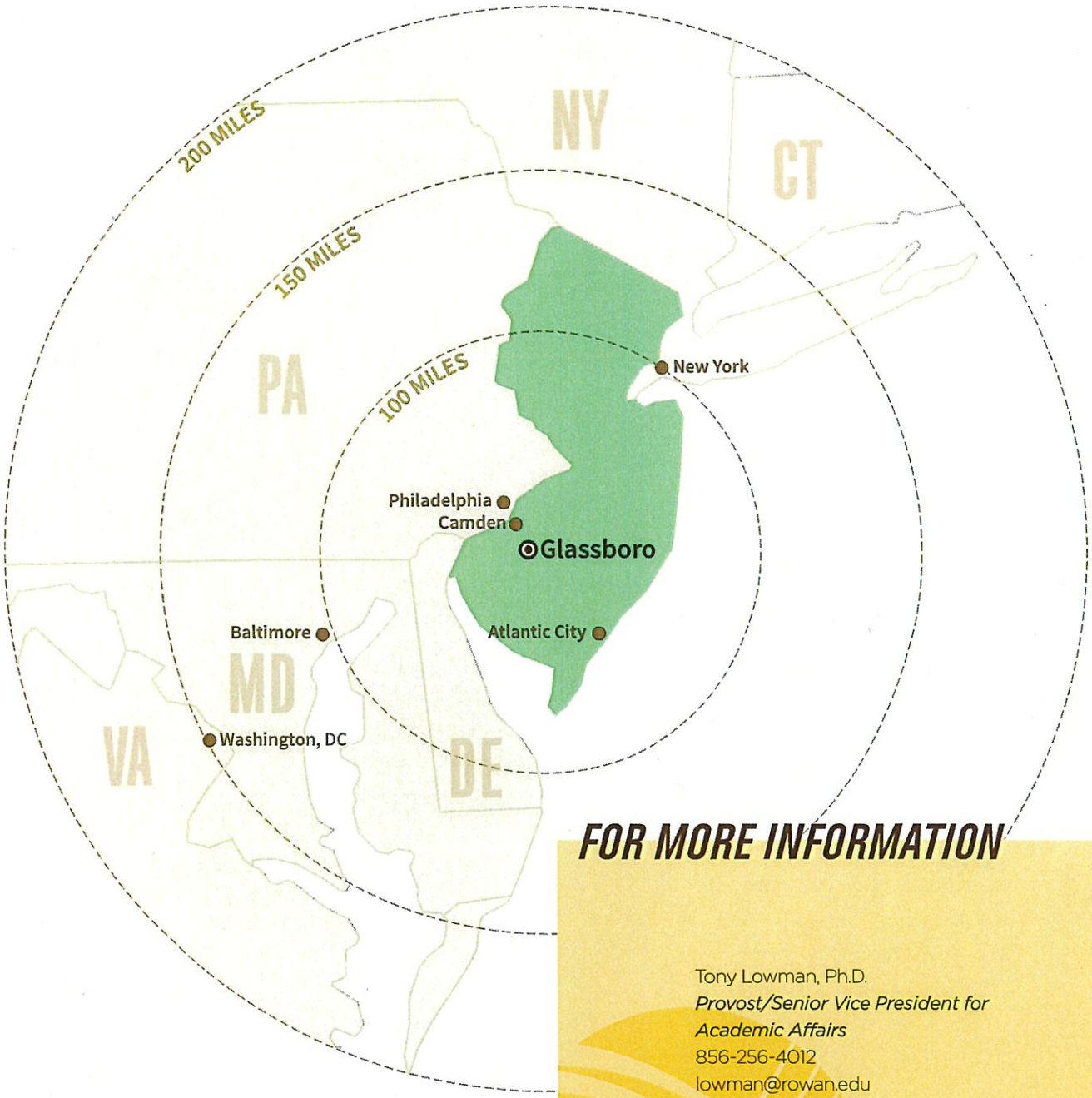
Existing/planned facilities

1. Veterinary School and Health Science Research Facility
2. Samuel H. Jones Innovation Center
3. Center for Research and Education in Advanced Transportation Engineering Systems (CREATES)
4. Inspira Medical Center
5. Global Solutions Hub
6. Future technology development
7. Modern food production
8. Future business development
9. Logistics hub
10. Future wellness development

UP22-080R1/100

152x

ROWAN'S MID-ATLANTIC STRATEGIC LOCATION



FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

153x

South Jersey Technology Park
at Rowan University

RESEARCH CENTERS & TENANT COMPANIES

Located on Route 322 near the junction of Route 55 in Mantua Township, the South Jersey Technology Park of Rowan University provides competitively priced facilities for startup and established companies bringing innovative technologies to the marketplace. The site serves as an entrepreneurial incubator for technology-focused researchers, inventors, entrepreneurs, professors and students.

The Samuel H. Jones Innovation Center is the first of a planned multi-building complex at the park. It offers 45,000 square feet of laboratory and office space for two dozen tenant companies, Rowan's Virtual Reality Center and academic research facilities focused on new materials and transportation engineering.

Technology business incubator

Facilities and services for new regional, high-growth technology startups, with ready access to Rowan University's student pipeline, faculty research and equipment.

Office of Technology Commercialization/ Rowan Innovations

This office serves faculty, staff and students in all aspects of intellectual property. Its mission is to manage, protect and license to industry the intellectual property developed and created at Rowan University.

154x

TECH PARK CENTERS & INSTITUTES

Advanced Materials & Manufacturing Institute

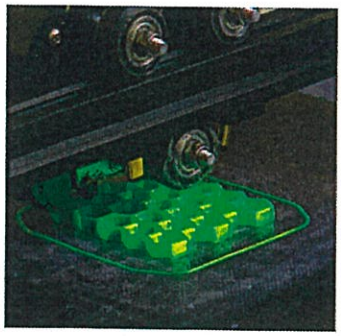
- Responsibly using nature's chemistries to enhance material performance and improve global sustainability
- Sustainable Materials Research Lab: research-related production of polymers and polymeric composites comprised of bio-based materials

Center for Research & Education in Advanced Transportation Engineering Systems (CREATES)

- Developing cutting edge, applied and readily implementable research in transportation engineering
- Only academic institution in the northeast region of the United States equipped to conduct state-of-the-art accelerated pavement testing

Virtual Reality Center: The CAVE

- Room-sized, virtual reality (VR) environment, featuring an immersive surround screen and surround sound



21 TENANT COMPANIES

Life sciences, new technologies, product development and more

Systems Innovation Engineering, LLC
Thunderbolt Solutions
Andermatt USA
Durin Technologies
DXE Technologies
Dynagarde
FocalCool, LLC
General IT Solutions LLC
Inspira Health Network Innovation Center
Insituware
Internet Video Archive, LLC
Lockheed Martin
LookPrior, Inc
OcuMedic
PAZ Pharmaceuticals, LLC
QID
ReGelTec Inc
Sentrimed, Inc.
Strategic Billing Enterprise
Thais
Ultimara Corp

FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

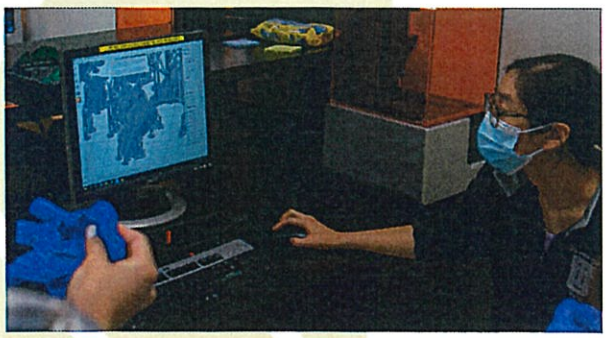
R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

155x

South Jersey Technology Park
at Rowan University

ADVANCED MATERIALS & MANUFACTURING INSTITUTE

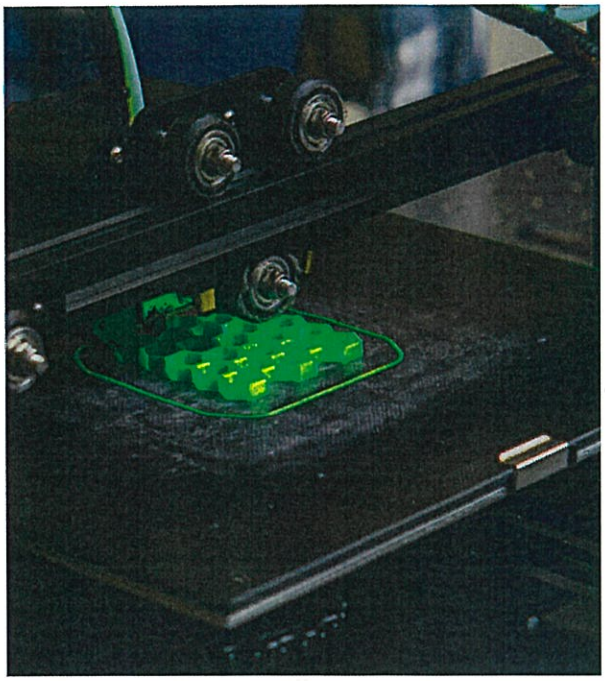
Established in 2019, Rowan University's Advanced Materials and Manufacturing Institute (AMMI) is working to enhance material performance and improve global sustainability through the responsible use of renewable resources and fossil reserves.



Its research projects include the development of new processes for the sustainable production of bio-based polyesters and creating new structural materials and production methods for the U.S. Army.

The facilities feature versatile labs and performance testing instrumentation, available for fee-for-service and fixed-price opportunities.

156x

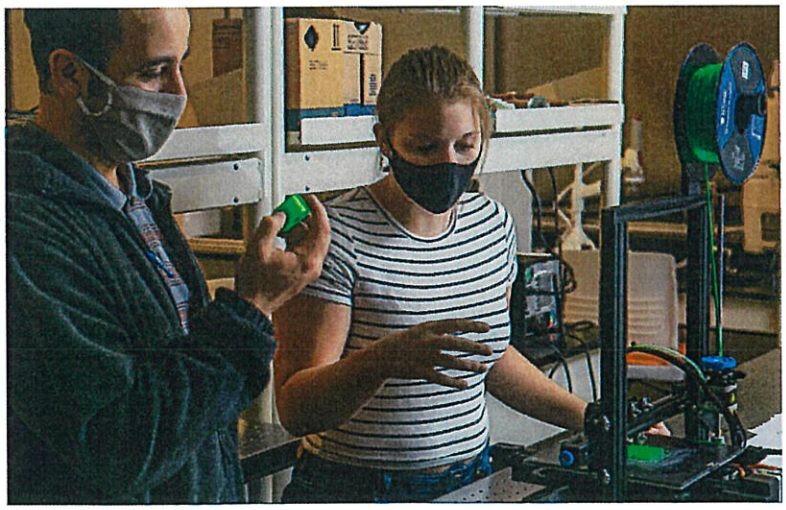


Cold Spray Lab

Unique to AMMI is its Cold Spray Lab, equipped with an automated cold spray additive manufacturing system and custom-produced mini cold spray units suitable for materials production and protection, repair and restoration.

The institute also offers a wide range of materials testing, prototyping and device fabrication services.

Led by Dr. Joseph Stanzione, associate professor in chemical engineering at Rowan University, the institute hosted the 27th BioEnvironmental Polymer Society Meeting in 2021, welcoming more than 80 speakers from around the world who presented their research over three days on bio-based and sustainable materials and technologies.



FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

South Jersey Technology Park
at Rowan University

MODERN FOOD PRODUCTION

In southern New Jersey, Rowan University is leading the way in developing modern food production systems, leveraging the agricultural potential of our 600-acre West Campus, which includes 100+ acres set aside to develop and employ modern food production techniques.

Situated on a vast former peach farm, Rowan's West Campus is planned to be the site of developments including:

- Partnership with an international bioenergy company that's a leader in anaerobic digestion, renewable energy and healthy soils.
- A 100-acre+ working farm, a significant portion of which will be dedicated to research
- A 5,200 sq. ft. research-level glass greenhouse
- An installation of greenhouse planting tunnels, plastic enclosures that enable three-season farming

Throughout the University, Rowan is pursuing several sustainability-related ventures including:

- Forming a Department of Sustainable Food Systems within the School of Earth & Environment. The department will incorporate faculty from four colleges with expertise in food systems as well as adjunct faculty with expertise in key areas.
- An Outreach Center for Sustainable Food Partnerships. Housed within the new department, the Outreach Center will: 1) bring faculty expertise to regional food entrepreneurs through a revenue-generating consultancy (a system that's analogous to a county extension for the new food economy); and, 2) create a pipeline for job training, internship experiences and future employment for our students.
- A new bachelor of arts degree in Sustainable Food Systems

158x

Infrastructure for the Sustainable Food System program includes:

- On the main campus, classrooms, a teaching kitchen and Food Village housing to encourage scholarly interactions and community
- On the West Campus,
  - 2-5 acres for field-grown crops, plus two greenhouses supported by an irrigation system, farm equipment and storage for machinery and produce.

Research initiatives

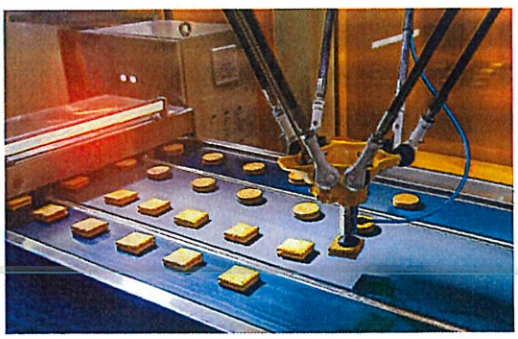
- hydroponics
- methane reduction
- anerobic digestion facilities
- composting and waste reduction

Ongoing recruitment of partners

Rowan seeks to partner with and bring together food entrepreneurs from around the region and the world.

Among plans:

- train traditional and non-traditional students using wholistic, innovative approaches
- build community
- encourage regenerative practices
- develop the workforce of tomorrow



FOR MORE INFORMATION

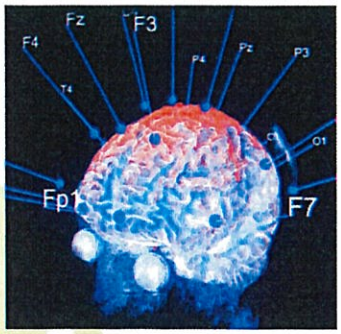
Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

159X

South Jersey Technology Park
at Rowan University

LIFE SCIENCES



Designed for flexibility, Rowan University's West Campus includes the South Jersey Technology Park, a business hub and incubator with a strong emphasis on the life sciences sector. Available for partnership opportunities, the 600-acre West Campus includes 180 acres set aside for business expansion.

Fully 35 percent of the University's research grants are related to investigations in health care and biotech advancements, a natural result of the University's strengths. A Carnegie-classified (R2/high research activity) institution, Rowan University is home to the School of Osteopathic Medicine and Cooper Medical School of Rowan University. The institution is also in the midst of developing New Jersey's first veterinary school, expected to welcome its first class of students in 2025.

Additionally, the University has earned national recognition for innovation and its public-private partnerships, including with Virtua Health, South Jersey's largest health system; Cooper University Health Care, which operates South Jersey's only Level 1 trauma center; Inspira Health Network and all major health systems in the area.

Rowan also partnered with the region's higher education institutions to open the Joint Health Sciences Center, a biomedical research and educational facility in the heart of Camden, just 15 miles from the institution's main campus.

160x

LIFE SCIENCE COMPANIES AT THE TECH PARK

Andermatt USA
Biological alternative pest management: insecticides, soil fungicide, biostimulants and bioinoculants, microbials for seed treatments and coatings, rodent control and trapping systems.

Durin Technologies Inc.
Diagnostic test development for early detection of neurodegenerative diseases.

FocalCool, LLC
Medical device research company focusing on therapeutic devices that improve patient outcomes using temperature control.

Inspira Health Network Innovation Center
Accelerating development and implementation of leading-edge, patient-focused products and technologies.

Ocumedic, Inc.
Medical device company developing revolutionary eye care technologies for patients recovering from ocular surgeries, corneal abrasions and other eye problems.

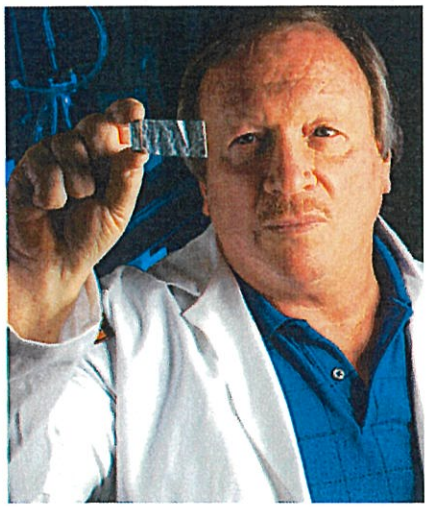
PAZ Pharmaceuticals, LLC
Developing first-in-class, small molecule drugs focused on targeted cancer chemotherapy.

ReGelTec Inc.
Medical device company developing a treatment for chronic low back pain.

Sentrimed, Inc.
Developing novel drugs that specifically target malignant and metastatic cancer cells.

Thais Health
Remote care management, offering patient-focused AI technology platform.

With easy access to Route 55, the South Jersey Technology Park is ideally situated for growth and primed to take advantage of Rowan's expanding ventures in research and partnerships.



FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

161 x

RowanUniversity

GLOBAL SOLUTIONS HUB

An entrepreneurial ecosystem focused on resurgence

Rowan University—in partnership with the State of New Jersey, Rowan College of South Jersey, Gloucester County Institute of Technology, Gloucester County and private industry partners—stands ready to spur South Jersey's post-pandemic economic resurgence by establishing the Global Solutions Hub at Rowan University. It solidifies Rowan as the preeminent regional economic driver, prepared to lead economic growth and recovery.

ARCHITECTURAL RENDERING

The Hub will be:

- convenient to major mid-Atlantic highway corridors, air, sea and rail transportation
- strategically located at Rowan's West Campus, one mile from the main campus
- aligned strategically with Rowan's robust academic programs to tackle real-world problems and scale meaningful, practical solutions to the region and beyond.

162x

The forward-thinking, environmentally conscious ecosystem will include a 250,000 sq. ft. LEED-certified mixed R&D, corporate and manufacturing facility established in collaboration with the Gloucester County Improvement Authority to create approximately 350 new direct jobs and provide space to solve real-world problems.

Academic partnerships for professionals

The Hub will include specialized, industry-driven certificate and advanced-degree programs in key emerging and high-demand fields where Rowan University has strength and, with industry partnership, unlimited capacity for growth. Partners will benefit from direct access to pipeline talent, R&D and an entrepreneurial ecosystem to pursue development in:

- Manufacturing and supply chain
- National defense (including advanced materials)
- Health care
- Energy (especially offshore wind)
- Information technology
- Biodefense
- Food innovation
- Cannabis research

FOR MORE INFORMATION

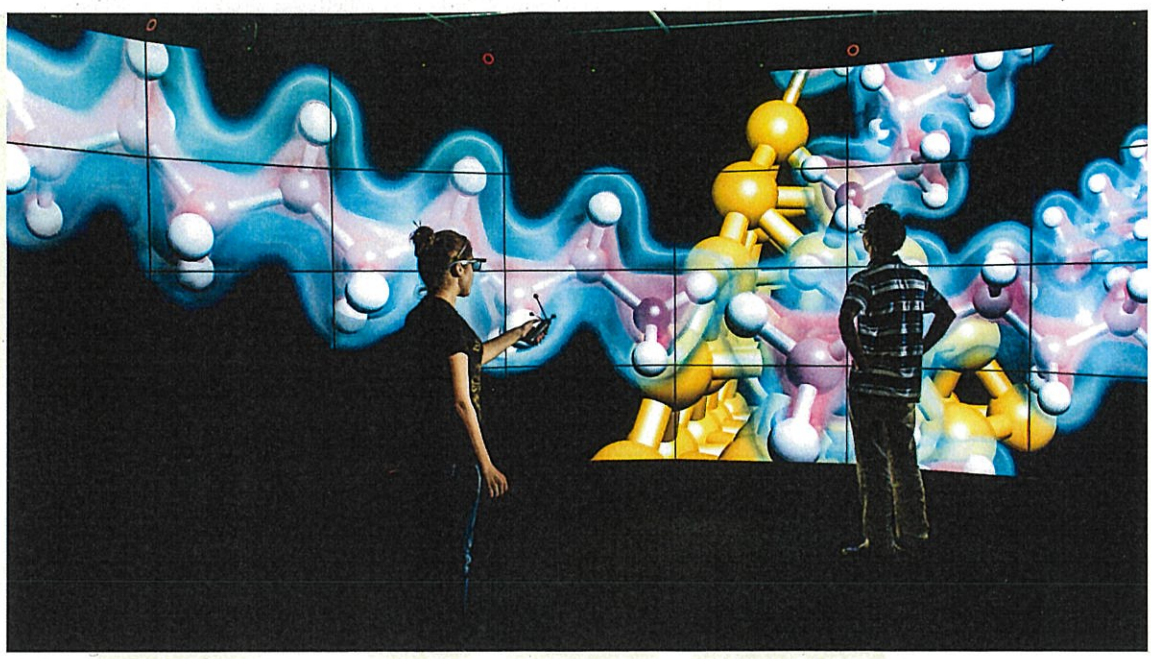
Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

163x

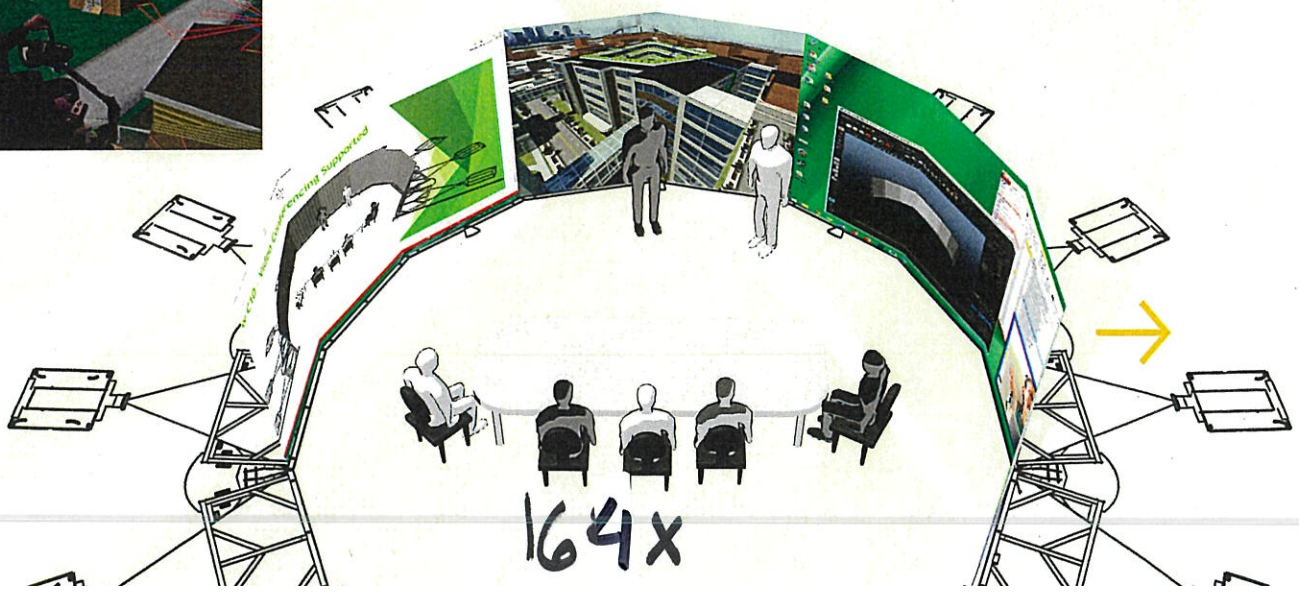
South Jersey Technology Park
at Rowan University

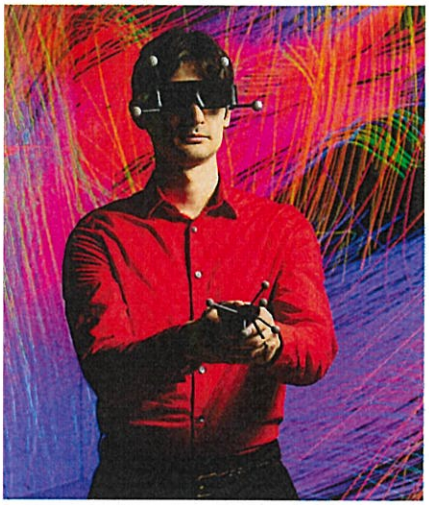
VIRTUAL REALITY CENTER



The Virtual Reality Center's team of experts create innovative virtual reality and augmented reality applications. The center offers a one-of-a-kind collaborative environment built to support cutting-edge research by Rowan University's faculty and students and the surrounding community, including nonprofit, government and corporate clients.

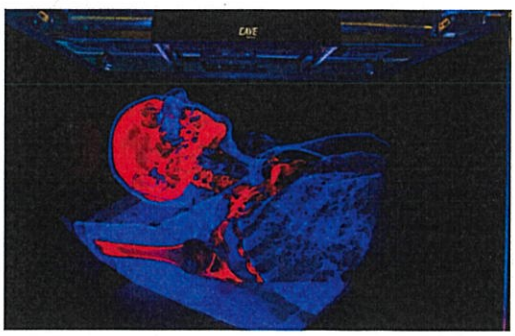
The centerpiece of the VR Center is a custom-designed immersive lab, featuring a 7-foot-high by 40-foot-wide curved wall of screens with room for up to 25 people to work together on 3-D applications. The center is also equipped with an array of virtual reality and augmented reality head-mounted systems and 3-D printers.





From developing virtual projects for the U.S. Army to providing doctors with tools to treat patients, researchers have used the center to tackle real-world problems. The technology makes it possible to address wide-ranging and complex challenges in a cost-efficient and safe virtual environment.

The VR Center is available to rent for those who want to showcase work or host a meeting.

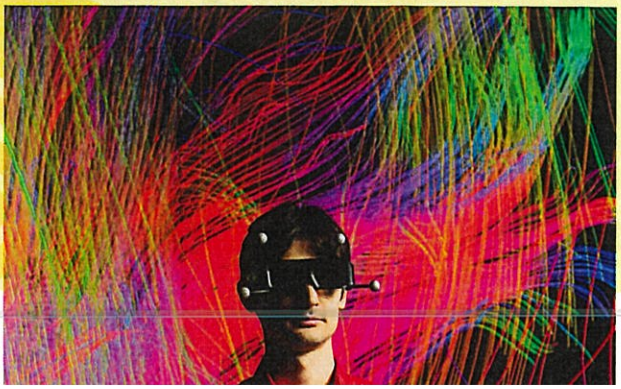


OTHER SERVICES INCLUDE:

- Research and development
- Design and visualization
- Virtual reality consultations
- Virtual reality educational seminars
- 3-D printing, scanning and prototyping

FOR MORE INFORMATION

George Lecakes, Jr.
Director

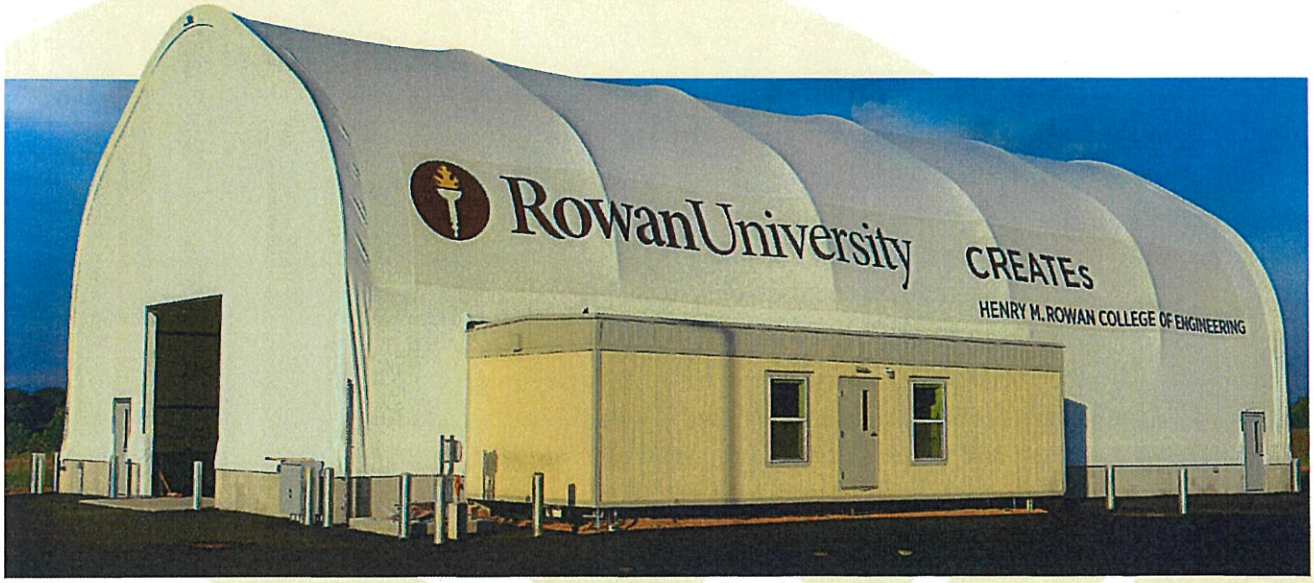


165x

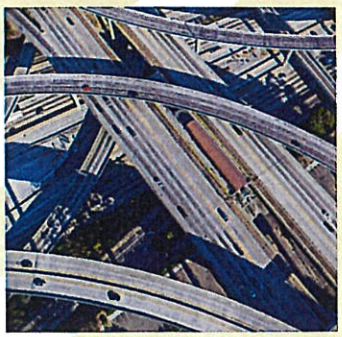
South Jersey Technology Park
at Rowan University

CREATES

Center for Research & Education in Advanced Transportation Engineering Systems



The Center for Research and Education in Advanced Transportation Engineering systems (CREATES) conducts cutting-edge research on transportation-related projects for government, manufacturers and contractors, helping to enhance roadways and landing strips, assessing existing and new materials, and improving safety and the environment.



About CREATES:

- CREATES research enhances the transportation industry by creating improved construction materials and pavement technologies, developing solutions to ease traffic congestion, and introducing efficiencies to improve construction and infrastructure.
- The Rowan University Accelerated Pavement Testing Facility is home to a Dynatest Mark IV Heavy Vehicle Simulator (HVS) capable of simulating two decades of highway traffic, airplane traffic and more in a quarter to half a year, enabling researche[illegible] to assess the status of

166x

existing structures and evaluate the potential of new materials and how they will hold up to cars, trucks and airplanes.

- The HVS, which can drive at up to 2.5 mph with an electric-powered wheel that mimics traffic, enables researchers to evaluate such concerns as soil failure, moisture impact and road structures and for clients to ensure quality and save money.
- The award-winning and professionally accredited Rowan University Construction Materials Laboratory enables agencies to conduct a wide range of materials tests, including basic and advanced flexible and rigid pavement tests.
- The 50-foot by 90-foot CREATES hangar houses equipment, offices and space to run tests adjacent to an outdoor testing environment that can be designated for specific types of materials and clients.
- Clients may "adopt" one or more of the 22 pavement sections, dedicating it/them solely to their work.
- The CREATES HVS is the only one in the Northeast United States to be housed at a university.

FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

167x

RowanUniversity

INSTITUTE FOR CANNABIS RESEARCH,
POLICY & WORKFORCE DEVELOPMENT

FOCUSING ON CANNABIS ACROSS DISCIPLINES

The multi-disciplinary institute provides expertise and guidance for policymakers, health care professionals, pharmaceutical industries, government agencies, and businesses as it relates to the legalization of cannabis.

The institute has three areas of focus:

Center for Cannabinoid Science & Therapeutics

College of Science & Mathematics

The center systematically investigates the active compounds in cannabis extracts, their actions and effects on long-term health and well-being. Research focuses on the health benefits and risks to the legalization of marijuana and related products.

Within the center, cluster research groups focus on chemistry, pharmacology and behavior and therapeutic use.

Academic offerings are under development at undergraduate and graduate levels in the following areas:

- For STEM majors, courses in research techniques used to determine the chemical and biological properties of cannabinoids;
- For non-STEM majors, courses to help students a practical understanding of the medical, physiological, pharmacological and socio-economic roles of medicinal cannabis;
- For health professionals, seminars and conferences for continuing education credit.

168x

Center for Cannabis Workforce Development

William G. Rohrer College of Business

Career opportunities in the rapidly growing cannabis industry are vast, and cross-over talent is in high demand. Business acumen is critical for both plant-touching verticals and ancillary businesses serving the cannabis industry, including accounting, finance and banking, data analysis, marketing, supply chain, and health care management.

Academic offerings in cannabis commercialization include:

- An MBA concentration;
- A certificate of graduate study;
- Courses include the evolution of the cannabis industry; business model innovations in cannabis; elective courses focused on cannabis, such as chemical analysis of cannabinoids, cannabis legislation, legalization and decriminalization at work, cannabis research and policy development; and electives in complementary areas such as diversity and inclusion, community justice, social entrepreneurship and impact investing for change, capital budgeting, supply chain, analytics, and sustainability.

Socio-Behavioral, Security & Law Enforcement Cannabis Center

College of Humanities & Social Sciences

Laws passed for marijuana for recreational use signal a societal shift in attitudes toward cannabis. Through social science research, the center is working to become the reference point for New Jersey and other states for cannabis research and training, public policy, law enforcement and other criminal justice agencies.

Academic offerings include:

- A certificate of graduate studies for cannabis specialists on the assessment and social control of legalized cannabis;
- A certificate of undergraduate studies in the social behavioral impact of cannabis legislation;
- Graduate courses: cannabis legislation, regulation and policy evaluation; marijuana legalization and decriminalization in work, leisure and other settings; cannabis research, program evaluation and policy development;
- Undergraduate courses: cannabis history, culture and social institutions; cannabis legislation and society; and cannabis industry.

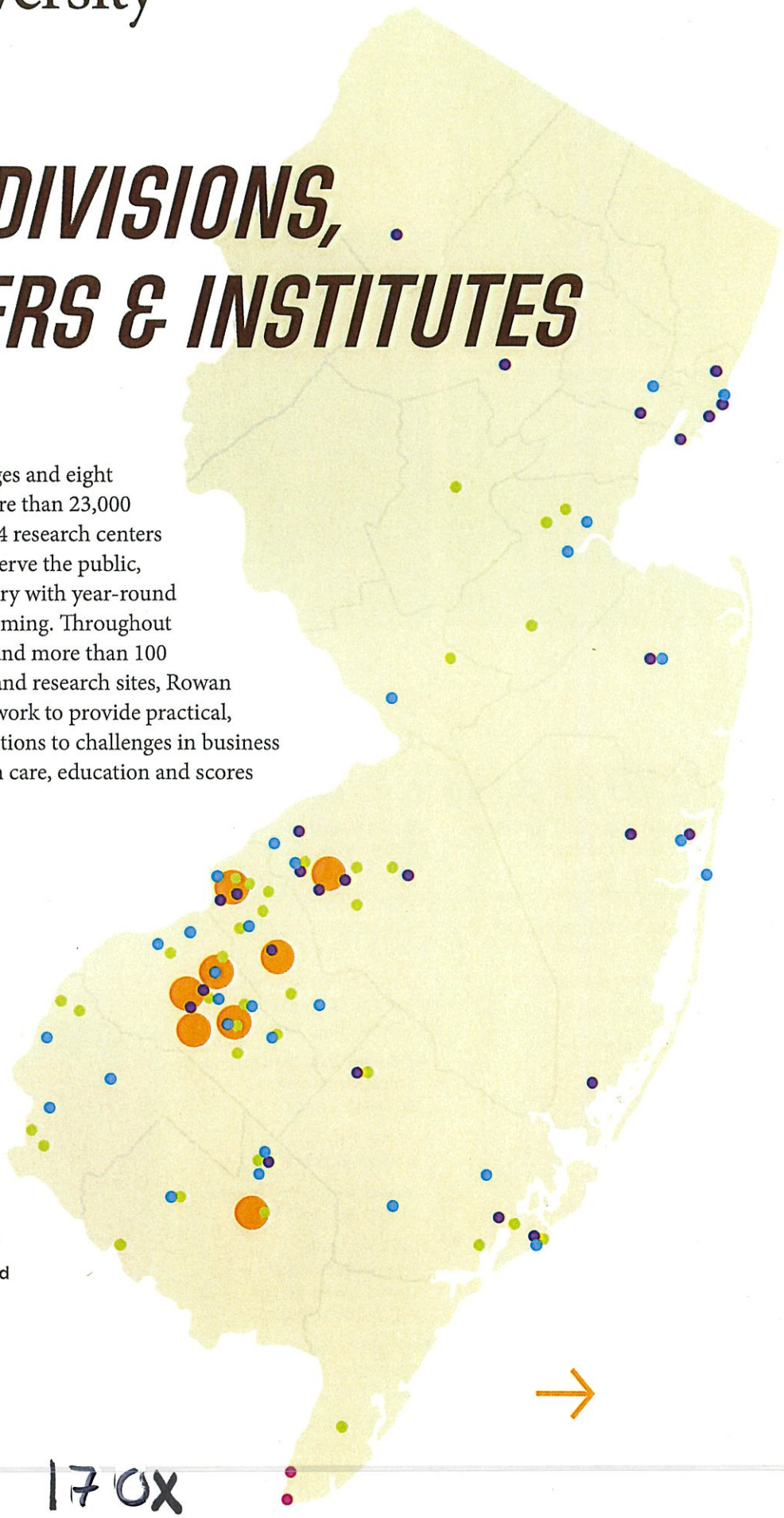
UP22-044/100

169x

RowanUniversity

ACADEMIC DIVISIONS, CENTERS & INSTITUTES

Rowan's eight colleges and eight schools educate more than 23,000 students and host 24 research centers and institutes that serve the public, business and industry with year-round access and programming. Throughout its eight campuses and more than 100 education, clinical and research sites, Rowan University experts work to provide practical, research-based solutions to challenges in business and industry, health care, education and scores of other interests.



ROWAN CAMPUSES

- **Glassboro**
- **Stratford**
  - School of Osteopathic Medicine
- **Camden**
  - Cooper Medical School of Rowan University
  - Camden Academic Building
  - Joint Health Sciences Center
- **Jean & Ric Edelman Fossil Park of Rowan University** (Mantua)
- **Rowan West Campus** (Mantua)
  - South Jersey Technology Park
  - Athletic complex
- **Rowan College of South Jersey-Gloucester**
- **Rowan College of South Jersey-Cumberland**
- **Rowan College at Burlington County**

OFF-SITE SERVICES

- College of Education
- Henry M. Rowan College of Engineering
- School of Osteopathic Medicine

17 OX

COLLEGES & SCHOOLS

- Henry M. Rowan College of Engineering
- Ric Edelman College of Communication & Creative Arts
- William G. Rohrer College of Business
- Virtua Health College of Medicine & Health Sciences
- Cooper Medical School of Rowan University
- School of Osteopathic Medicine
- College of Education
- College of Humanities & Social Sciences
- College of Performing Arts
- College of Science & Mathematics
- Virtua Health School of Nursing & Health Professions
- School of Earth & Environment
- School of Innovation & Entrepreneurship
- School of Translational Biomedical Engineering & Sciences
- School of Veterinary Medicine
- Graduate School of Biomedical Sciences

CENTERS & INSTITUTES

Engineering and Science

Center for Cannabis Research, Policy & Workforce Development

Center for Cybersecurity Education & Research

STEM Outreach Center

Sustainable Facilities Center

Virtual Reality Center

Health Care

Behavior Analysis, Research & Services Institute

Child Abuse Research, Education & Service Institute

Center for Humanism, Professionalism, Medical Ethics & Law

Institute for Public Policy & Citizenship

Integrated Special Needs Center

NeuroMusculoskeletal Institute

New Jersey Institute for Successful Aging

Societal and Global Issues

Center for Study of Holocaust, Genocide & Human Rights

Hollybush Institute for Global Peace & Security

Liberal Arts & Sciences Institute for Research & Community Service

Arts and Education

Center for Access, Success& Equity

Center for Art & Social Engagement

Maynard Ferguson Institute of Jazz Studies

Business and Communication

Center for Innovation & Entrepreneurship

Center for Sports Communication & Social Impact

Center for the Advancement of Women in Communication

FOR MORE INFORMATION

Tony Lowman, Ph.D.
Provost/Senior Vice President for Academic Affairs
856-256-4012
lowman@rowan.edu

R.J. Tallarida, Jr.
Chief of Staff
856-256-5413
tallarida@rowan.edu

171x

MONTCLAIR STATE UNIVERSITY

Testimony of
Montclair State University:
Dr. Lora Billings, Dean, College of Science and Mathematics
Valeria Aloe, Director of Strategic Planning, Feliciano School of Business
Elizabeth Rich, Acting Executive Director, Feliciano School of Business
Maria Rodriguez-Gregg, Director of Government Relations
For the Assembly Science, Innovation, and Technology Committee
November 30, 2022

Subject: Innovation and Start Up Ecosystems
Chair Tully and Members of the Assembly Science, Innovation, and Technology Committee:

We appreciate the opportunity to address the committee and provide insight to the variety of initiatives Montclair State University is engaged in that aim to spur innovation.

For public colleges and universities to truly serve the public good, they must realize their potential as true solutions engines capable of helping the communities they serve solve our most pressing challenges.

At Montclair State University, we are creating transformational opportunities for students to make a difference in the world through experiential learning. But we are also equipping our surrounding communities with the resources they need to innovate in areas including entrepreneurship, sustainability and the green economy.

For us, public service is not extra credit - it's the assignment. And we want to do even more to realize our potential as a true economic driver for the State of New Jersey.

College of Science and Mathematics
Dr. Lora Billings, Dean

The College of Science and Mathematics at Montclair is a research-driven solutions generator intertwined with an educational mission. We are committed to building community collaborations and partnerships to solve real world problems and train a diverse and creative STEM workforce for New Jersey and beyond. Climate change is upon us and energy use is at the core of the crisis. We are committed to building an ecosystem that supports clean energy and sustainability that will meet the Governor's goal of 100% clean energy by 2050.

Investing in experiential learning through internship programs such as the PSEG Institute for Sustainability Studies Green Teams and academic programs such as the doctoral program in Environmental Science and Management, the College has created a thriving community of scholars to conduct cutting-edge research, educate new generations of scientists, scholars and entrepreneurs, and fuel the region's economic growth.

Our Clean Energy and Sustainability Analytics Center also has ongoing relationships with corporate partners, utility providers, and government agencies to identify, quantify and interpret the ramifications of clean energy development and to facilitate energy planning. We participate in the New Jersey Commission on Science, Innovation and Technology's Clean Tech Research and Development Voucher Program to support early-stage clean tech and clean energy companies. One example is our partnership with iCheck Energy, LLC, who is performing an energy audit of select buildings of the University to understand energy usage and identify ways to improve efficiency. We are also part of the NJ Wind Fellowship Program, which recruits New Jersey students into offshore wind jobs and supports next generation research for the offshore wind industry.

Building on our successful partnerships with the nearby city of Paterson, the College proposes to develop the New Jersey Green Innovation Center to serve as the state's information resource for emerging energy and sustainability resources. Located near the Great Falls along the Passaic River, the setting provides an ideal spot for meetings, workforce training, and K-12 education throughout the year while bringing new business and economic opportunities to this urban and historically underserved part of New Jersey. The project would increase public access to environmental resources, foster public participation in green innovation, and promote environmental justice.

The unique location has a rich history in hydropower, supporting multi-tiered raceways for an industrial park for 154 years. The Center would embrace scientific innovations in sustainability: past, present and future. It would invigorate local environmental education and training programs in the domains of clean energy, water and wastewater, green infrastructure, resource conservation, waste management, and sustainability for Paterson and nearby areas. We envision it as a living laboratory to test sustainability and clean energy design in a setting that emphasizes the importance of conservation. It could be a hub that brings together innovators in climate tech, communicates economic opportunities, and educates the public in the latest practices in clean energy adoption and sustainable practices. By fostering tech based regional knowledge ecosystems, activities at the Center would guide the New Jersey Green Workforce of the future. The possibilities for public service are endless and we hope you support our ambitious project.

Feliciano School of Business
Feliciano center for Entrepreneurship and Innovation
Valeria Aloe, Director of Strategic Planning
Elizabeth Rich, Acting Executive Director

Founded in 2013, the Feliciano center for Entrepreneurship and Innovation at Montclair State University is a dynamic initiative designed to serve as a catalyst for innovation, economic inclusion and access for current and future entrepreneurs.

The Center serves as a link between startup founders seeking help and those who have the experience, knowledge and financial means to provide critical assistance. A vibrant community of small businesses, leading-edge technology, experts and community partners, our mission is to support current and future entrepreneurs, particularly microbusinesses and "solopreneuers", as they launch their concepts and grow their businesses.

Our commitment to innovation in the startup economy is evident not only in our mission, but in how we facilitate it.

Our approach immerses our participants in an ecosystem of experimentation, in which founders can assess their concepts through multiple pathways of product validation, research, customer feedback, prototyping and refinement before proceeding to launch their businesses.

The goal is to equip students and community members with a new way of approaching problem solving, critical thinking and a transformational mindset that will lead to long-term personal and professional success, regardless of whether or not they choose to pursue entrepreneurship.

Our signature IGNITE Entrepreneurs program, launched in the spring of 2022, brings together a blend of on-demand virtual learning, experiential in-person workshops, and networking opportunities. Created after assessing the needs of the startup community following the onset of the pandemic, the six-month program is currently serving predominantly female founders and BIPOC entrepreneurs, both on campus and in our surrounding communities, with a supportive ecosystem and access to funding, technical support and the ability to experiment in a risk-free environment.

Highlights of the program include more than 50 on-demand educational videos and learning exercises, mentorship support, seed funding for committed participants with developed business plans, and community networking opportunities.

The populations we serve also have access to cutting-edge facilities that allow them to reimagine what is possible when creating prototypes of their concepts.

Montclair boasts one of the largest on-campus 3D printing facilities in the nation, our MIX Lab, which serves as an interdisciplinary hub for transformative innovation. MIX, which stands for "Making and Innovating for X" in which "X" is the unknown, offers prototyping services to the region's small and mid-sized manufacturing companies and helps creators develop real-world outcomes to our most pressing challenges.

Our success stories only strengthen our commitment to innovation and access: from a female founder working in our ecosystem and selling her company to Nutromics in 2021, to an alum who prototyped several of his products in our MIX LAB and has now gained national distribution in more than 50 home design stores, including Nordstrom, we are creating lasting change for the populations we serve, and truly changing the trajectory of people's lives.

TECHNET
THE VOICE OF THE INNOVATION ECONOMY

25th ANNIVERSARY

Pennsylvania and the Mid-Atlantic
Telephone 717.585.8622
www.technet.org | @TechNetMidAtla1

November 30, 2022

The Honorable Christopher Tully
New Jersey Assembly
205 Robin Road, Suite 122
Paramus, NJ 07652

RE: Innovation Ecosystem of Startups and Innovation in New Jersey

Dear Chairman Tully, Vice-Chair Carter, and Members of the Committee,

On behalf of TechNet, I respectfully submit the following comments for the November 30 hearing on the innovation ecosystem of startups and innovation in New Jersey.

TechNet is the national, bipartisan network of technology CEOs and senior executives that promotes the growth of the innovation economy by advocating a targeted policy agenda at the federal and 50-state level. TechNet's diverse membership includes dynamic American businesses ranging from startups to the most iconic companies on the planet and represents over five million employees and countless customers in the fields of information technology, e-commerce, the sharing and gig economies, advanced energy, cybersecurity, venture capital, and finance. TechNet has offices in Austin, Boston, Chicago, Denver, Harrisburg, Olympia, Sacramento, Silicon Valley, and Washington, D.C.

State legislatures, local jurisdictions, and courts across the country have reacted in different manners to the rise of new technologies, artificial intelligence, and the sharing and gig economies to oversee or regulate new and, in some cases, disruptive technologies. Any new legal or regulatory requirements should be tailored to the new product, directly tied to an identified harm, limited to gaps in existing coverage, focused on bad actors, and narrowly tailored to avoid conflicts or discrepancies in the law and unintended consequences. In addition, corresponding rules and regulations that apply to legacy providers should be adjusted accordingly to allow for

technological neutrality. TechNet promotes policies that encourage the development of entrepreneurship, mobile commerce, and the next wave of innovation in the new economy. Establishing an innovation-friendly policy framework is the key to the competitiveness of the technology industry. To ensure competitiveness and innovation, TechNet supports the following principles:

- **Reasonable Statutory and Regulatory Framework** - New technologies bring new products and services to the market. Occasionally, these new products and services generate significant policymaker interest because of transformative features with little precedent and high consumer interface. Autonomous vehicles, peer-to-peer car sharing, unmanned aerial vehicles, blockchain, cryptocurrency, and self-service healthcare, including telehealth and teledentistry, are examples. While some lawmaking may be needed or helpful, TechNet will be vigilant against vague, overbroad, unnecessary, harmful, or hostile laws and regulations that stifle innovation. TechNet is supportive of efforts to modernize legal frameworks that aim to sensibly regulate novel products and services if they advance American leadership in innovation, support the future of the product, focus on prohibiting negligent, reckless, or criminal conduct and on the actors, rather than the technology, and avoid duplicating existing requirements and creating unclear overlap or conflicts with existing requirements, among others.
- **Access to Markets** - While policymakers must balance new innovations with consumer protection, TechNet is inclined to oppose regulatory restrictions imposed to protect existing markets from competition, such as excessive insurance requirements, prohibitive licensing requirements, caps on the number of services a company can provide, and unreasonable barriers to market entry. TechNet supports legislation to protect consumers when it is based on an identifiable harm that has occurred or could occur. We would encourage policymakers to note the difficulties inherent in state or local regulation of companies and products that are multi-state or global in operations, including the interplay of other state or federal legal requirements.

176x

- **Access to Talent** - The modern workforce requires a flexible employment environment that allows workers to find opportunities that match their skills, interests, and availability. TechNet supports efforts to develop new avenues and "safe-harbors" that empower companies to voluntarily provide new protections and benefits to workers where appropriate without impacting classification outcomes. In the classroom, TechNet promotes the use of digital content and tools to provide individualized, data-driven learning and improve educational outcomes, and supports efforts to secure stable funding for digital education, aligned with a statewide vision to expand and promote digital innovation in the classroom.
- **Broadband and Internet Access** - TechNet sees the internet as a key tool for consumers' access to information and empowerment. Internet access connects consumers with the tools they need to live a more flexible lifestyle, increasing their access to telehealth, remote education, civic engagement, provision of government services, and allowing for workplace flexibility. Embracing policies that close the digital divide and expand access to the internet and technology, provide a safe and secure consumer experience, and promote strong private sector competition and investment (while opposing provisions that would create unnecessary or burdensome regulations or legal requirements) is a core value of TechNet. TechNet will support efforts to increase and expand high speed broadband deployment to currently unserved areas and increase adoption by encouraging private investment and making government funding competitively available to providers for those hard-to-serve areas where private investment on its own is not sufficient.

Recognizing the benefits of the innovation ecosystem and startups in New Jersey, and allowing for flexibility to promote new innovations, is critical for technology to thrive and benefits the citizens of New Jersey. Thank you for your time and consideration on this important issue. We look forward to working with you and please don't hesitate to reach out should you have any questions.

177x

[redacted]

TECHNET
THE VOICE OF THE
INNOVATION ECONOMY

Sincerely,

Margaret Durkin

Margaret Durkin
Executive Director, Pennsylvania and the Mid-Atlantic
TechNet

1784

Building Bridges II

BREAKING DOWN BARRIERS

Perspectives from Academia and Industry on Building a New Jersey Innovation Ecosystem

NJPRO

InnovationNJ


collaboration
ecosystem
innovation
industry
BUILD
TOOLS
academia
research

180x

New Jersey

Building Bridges II

BREAKING DOWN BARRIERS

Perspectives from Academia and Industry on Building a New Jersey Innovation Ecosystem

NJPRO InnovationNJ

March 2013

181x

The NJPRO Foundation, in collaboration with the InnovationNJ Coalition, wrote this report. It builds upon prior research conducted by the NJPRO Foundation.

NJPRO and InnovationNJ appreciate the participation from industry and academia in our focus groups. Without our collaboration partners, this report would not have been possible.

The NJPRO Foundation invites you to join the public dialogue on this report after March 2013 at **www.njprofoundation.org** or **www.innovationnj.net**

The NJPRO Foundation
102 West State St
Trenton, NJ 08608

www.njprofoundation.org

182x

NJPRO Trustees

Table of Contents

183x

Executive Summary

Scientific advancement. Growing the economy and creating jobs. Improving the quality of life. These are the rewards that are reaped from "innovation" - the search, development and commercialization of the next great idea, process, product or technology.

While New Jersey has been historically a national and global leader in innovation, from the first U.S. manufacturing facilities on the Passaic Falls, to being the home of the telecommunications and pharmaceutical industries, the state now has greater competition for industrial research and development (R&D) investment. As the early center of the country's research-based industries, the private sector was able to support New Jersey's innovation economy with little assistance. These innovator companies had the capital to invest in hiring their own researchers, building their own laboratories, and conducting all their research in-house. In fact, these industries did not just do market driven research but they conducted research for the sake of advancing science. Likewise, there was little competition from other states and emerging economies that did not have the benefit of an embedded industrial base. Thus, there was little need for R&D support from New Jersey's government or its academic institutions. Consequently, they took a laissez-faire approach to New Jersey's innovator industries and a chasm grew between industry and the academic communities.

In comparison, over the past 30-40 years, in their crusade to compete for the economic benefits that are generated by industry's R&D investment, other states' governments have been aggressively developing their "innovation ecosystems"- the marrying of the R&D efforts and resources of government, academia and industry. Most notably, these states have learned how to leverage their academic resources (i.e., talent, facilities and equipment) to jump-start their innovation economies. They recognized the trends that collaboration between academia and industry could advance their economies, and collaboration between academic institutions could further leverage resources to attract industry partnerships and build their states' innovation ecosystems. As innovator companies outsource an increasing level of their research and seek to work with the leading experts in their fields, states that are using their academic resources as economic development tools have gained an advantage in attracting industry investment by being able to meet the varying R&D needs of mature and emerging research-based companies.

Utilizing their academic resources for economic development purposes has proven to be highly successful for competing states in attracting and retaining industry investment, ratcheting up the pressure on New Jersey state government and its academic institutions to meet this challenge and provide a competitive level of support.

This report builds upon the work of NJPRO's July 2010 report, *Building Bridges Between Academic Institutions, Business and Government to Bring Innovation to the Marketplace (http://www.njprofoundation.org/pages/bridges.htm)* That report proposed that New Jersey's universities and colleges now serve as a cornerstone for the state's innovation economy to attract increased industry investment and be a catalyst for economic growth.

For this follow-up report, *Building Bridges II: Breaking Down Barriers: Perspectives from Academia and Industry on Building a New Jersey Innovation Ecosystem*, NJPRO partnered with InnovationNJ to conduct a series of eight industry-specific focus groups consisting of industry and academic participants, to discuss how to foster an environment for greater collaboration between industry and academia in New Jersey. Five challenges emerged from the focus group discussions as to what is inhibiting greater industry collaboration with New Jersey academic institutions:

- The need to alleviate the administrative burdens associated with partnering with a New Jersey academic institution.
- The need to improve the coordination of State, industry and academic R&D efforts and resources.
- The need to bridge the clashing cultural differences between industry and academia.
- The need to raise awareness throughout the business community of New Jersey's academic assets.
- The need to have the State, industry and academia work together to secure increased R&D funding, especially from federal government sources.

184x

To address these five challenges, the focus groups also generated 15 recommendations, each of which will be discussed in this report:

- To encourage greater collaboration, the State, industry and academia should collectively work to reform their IP protocols and investigate the feasibility of a uniform IP agreement for our State colleges and universities.
- Academic institutions should employ Master Agreements to avoid repetitive negotiations and to increase the efficiency of the execution of collaboration agreements.
- The State needs to identify within its institutions of higher education the expertise and resources that could form the basis for Centers of Excellence. Designation of a single center of excellence for a specific research topic would target resources and provide guidance to interested parties searching for a research partner.
- Academia, industry and the State should form consortiums dedicated to producing innovative ideas, products, and services and to attract increased federal funding.
- The State, industry and academia should work together to bring thriving and productive professional conferences to New Jersey.
- In an era of reduced and increasingly competitive government funding, academia, industry and the State must combine their resources and efforts to attract increased federal dollars.
- The State should establish a Council on Innovation to advise the Governor, Legislature and other officials on ways to promote innovation and manage the innovation ecosystem.
- The State and institutions of higher education should review their tenure policies to incentivize and reward tenure-track faculty members for conducting industry research.
- Academia and industry need to work together to design internship/co-op programs that provide maximum benefit to all stakeholders.
- Academia should emphasize the teaching of interpersonal skills and provide basic business training for STEM majors to facilitate the translation of research from the lab into commercialized applications.
- Academia should design user-friendly websites, to make it easier for business to find the resources they are seeking and to facilitate potential collaborations.
- New Jersey should more aggressively promote its academic assets to attract potential collaborators and research dollars.
- Academia, industry and the State should establish a comprehensive resource directory that includes existing research areas, capabilities and talent and publicly available assets and facilities at New Jersey colleges and universities.
- Each college and university should publicly promote its own chief administrator to serve as a one-stop-shop for business to access university information and resources.
- The State, academia and industry should find ways to improve co-ordination of their efforts to secure increased federal funding.

This report is intended to serve as a catalyst to get the State, industry and academia to work together to meld their respective R&D assets to build out the State's innovation ecosystem and reassert New Jersey's position as a global leader in innovation.

185x

Building Bridges II

The past few decades have brought significant change to the New Jersey innovation landscape. Until the late 20th century, the State was in the forefront of innovation, scientific advancement, and research and development (R&D). It pioneered such industries as telecommunications, life sciences, food processing, and petrochemicals. Items such as electric light and the phonograph (Edison), Band-Aid (Johnson and Johnson), the transistor (Bell Labs), the color television (RCA), and vaccines for measles, mumps (Merck) and streptomycin (Rutgers University) all were invented or discovered in New Jersey. Forced to find ways to catch up, rival states actively embraced their colleges and universities as engines for economic growth. By conducting sponsored research and providing facilities, equipment and intellectual expertise, these states have leveraged their academic assets to attract and support industry investment. Meanwhile, the emergence of the new global marketplace, offering companies greater choices on where to invest and find talent, has increased competition not only with other U.S. states, but with foreign countries, as well.

This change in the marketplace underscores the need for New Jersey to look closely at its innovation ecosystem. Recent attempts at collaboration by its industries and institutions of higher education have not matched the levels of activity and vigor of those initiated by its rivals. New Jersey has recognized the need to develop a strategy to compete. In December 2010, *The Report of The Governor's Task Force on Higher Education* (http://nj.gov/governor/news/reports/pdf/20101201_high_edu.pdf) urged New Jersey to "develop a structure to foster better collaboration between its businesses and its institutions of higher education."[i] This strategy must be jointly developed by state, industry and academic partners in order to be successful. This report recommends strategies to increase collaboration between these partners by examining the relationships and collective interests of each party.

Building Bridges I

In July 2010, the New Jersey Policy Research Organization (NJPRO) Foundation issued a report, *Building Bridges Between Academic Institutions, Business and Government to Bring Innovation to the Marketplace*, to examine these issues. That report showed that the State's universities and colleges must serve as the foundation for research and development to support innovation that is needed to drive the growth of New Jersey's high-technology economy. Leveraging the research capabilities of higher education institutions is necessary to help the State compete with other states and foreign countries that have positioned their schools as engines of growth.

At the same time, the Healthcare Institute of New Jersey also launched a report on medical innovation. Together these reports served to foster a discussion in the state on how to build collaborative efforts. The result was the creation of the Innovation NJ (INJ) coalition, whose goals include increasing private and public sector R&D, retaining and advancing high-paying innovation-related jobs in the state, and increasing the number of Science, Technology, Engineering and Mathematics (STEM) -related graduates from New Jersey colleges and universities.[ii] INJ is a coalition of more than 90 member businesses, higher education institutions and state government agencies dedicated to promoting policies that foster an innovation environment in New Jersey.

In the fall of 2011, the NJPRO Foundation and INJ embarked upon a study to examine the collaborative environment in New Jersey and to test the findings of NJPRO's *Building Bridges I* report. To that end, *Building Bridges II* seeks to shed light on actions that can assist the progress of industry-academia collaboration by talking directly to the experts in business and academia who initiate and manage collaborations as part of their regular work.

Building Bridges II

Building Bridges II utilized focus groups composed of academic and industry professionals representing eight New Jersey industries with a large R&D presence to test the hypotheses developed in *Building Bridges I*. INJ's Collaboration Committee played a major role in this report by recruiting INJ's members to participate in the focus groups for this study. The collective perspectives from academia and industry on how to bring about effective collaboration and develop New Jersey's innovation ecosystem distinguish this report and differentiate it from *Building Bridges I*.

This report examines specific data regarding what the experts on the ground saw as obstacles or aids to effective collaboration between academia and industry. The focus group participants' comments and insights illuminate courses of action that would accomplish the rebuilding of New Jersey's innovation ecosystem to drive growth and competitiveness for years to come.

186X

METHODOLOGY

Seeking to learn more about the factors that contribute to successful academia-industry partnerships in New Jersey and other states, NJPRO and INJ invited members from various organizations and institutions to take part in focus groups for this study. New Jersey's eight (8) leading innovator industries were targeted for inclusion in this study. Selected on the basis of their experiences with academic and industry collaborations, each group included 10 to 12 industry representatives and academic experts. The targeted industries were: Agriculture/Food Processing, Biotechnology, Chemical, Defense, Energy, Information Technology, Pharmaceuticals and Medical Technology, and Transportation and Logistics.

The higher education institutions represented were: Fairleigh Dickinson University, Monmouth University, Montclair State University, New Jersey Institute of Technology, Princeton University, Rowan University, Rutgers University, Stevens Institute of Technology and University of Medicine and Dentistry of New Jersey.

Moderated by a professional facilitator and lasting a minimum of 90 minutes each, the focus group sessions took place in the John J. Heldrich Center for Workforce Development, located at the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, New Brunswick.

FOUR KEY QUESTIONS FRAMED THE FOCUS GROUP DISCUSSIONS:

- What impediments, if any, are preventing greater collaboration between your industry and higher education in New Jersey?
- What resources, skills and support is each party seeking when searching for either an academic or industry partner?
- Does the State have a role in bringing industry and academia together?
- What recommendations do you have that will encourage greater collaboration between industry and higher education in New Jersey?

GROWING NEW JERSEY'S INNOVATION ECOSYSTEM

Bringing together both sides of the research equation, the focus groups aimed to provide perspectives and "ground truth" on prior research done in *Building Bridges I*. Emerging out of the conversations were common themes related to impediments, challenges, and best practices found in other states. The discussions brought to light several challenges in New Jersey to cultivating a functional innovation ecosystem. Five common themes arose during the discussions and include:

1. Administrative Burdens
2. Lack of Coordination Between the State, Business and Academia
3. Clashing of Cultural Differences
4. Lack of Dialogue Between Industry and Higher Education
5. Lack of Coordinated Efforts to Secure Funding from Various Sources

As we examine these five challenges, the report reviews the groups' discussions on how to overcome these impediments and presents NJPRO/INJ's recommendations aimed at fostering a world-class innovation ecosystem.

THE NEED FOR AN INNOVATION ECOSYSTEM

The case for building an effective innovation ecosystem is made in the National Science Foundation's report, *What is an Innovation Ecosystem?* which calls innovation the "fundamental source of significant wealth generation within an economy." In the report, written by Deborah J. Jackson, innovation ecosystem is defined as a model of "the economic dynamics of the complex relationships that are formed between actors or entities whose functional goal is to enable technology development and innovation."[iii] These actors, she says, include both the material resources (funds, equipment and facilities) and human capital (students, faculty, staff, industry researchers and industry representatives) that make up the institutional entities (colleges/universities, industry, funding sources and government) participating in the ecosystem.

Given the higher growth potential that high-tech industries typically offer, Jackson says that a state government has a "strong incentive" to play a role in developing and nurturing innovation ecosystems that spur job creation and economic growth. The challenge, however, is "figuring out how to turn the breakthroughs of R&D efforts into products that lead to profits." As Jackson points out, the difficulty in achieving success is getting two "distinct but largely separated" economies that comprise an ecosystem and operate on different reward systems, to coexist.

The recent reorganization of the State's higher education institutions demonstrates that New Jersey is committed to meeting this challenge.

"...One consequence of the higher education restructuring legislation is an expanded Division of Biomedical Sciences at Rutgers that will combine the tremendous life sciences strengths already present in our university...Putting all of this together under one roof – from basic research at the bench to clinical care at the bedside – creates a New Jersey powerhouse in the life sciences research. Simple addition of our current research programs pushes the new Rutgers well above $600 million in externally funded research annually, placing us among the top twenty universities in the nation..." [iv]

PRESIDENT ROBERT L. BARCHI
20TH PRESIDENT OF RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

These actions start to leverage and unite our independent research and development assets into one comprehensive innovation ecosystem. Actions such as the reorganization of the State's research universities will help to enhance educational opportunities, attract top faculty and students, attract increased federal research funds and strengthen partnerships between the higher education and business communities. Most importantly, increased collaboration serves as a catalyst for new companies, job creation and economic prosperity.

Challenge 1

Administrative Burdens

OVERVIEW: Administrative challenges are common in academia-industry collaborations. Dominant concerns among focus group participants is determining who owns the intellectual property (IP) rights and streamlining the contract process. The aim, therefore, is to make the collaboration process easier, faster and more cooperative.

The National Research Council of the National Academies 2003 report, *Government-Industry Partnerships for the Development of New Technologies Summary Report*, noted that contracts used by successful partnerships are spelled out in great detail – from the goals and metrics of progress, to the development of roadmaps to regular evaluations.[v] IP reform and the use of Master Agreements are ways to ease administrative burdens that are impeding greater collaboration, and building a healthier innovation ecosystem.

RECOMMENDATION 1

To encourage greater collaboration, the State, industry and academia should collectively work to reform their IP protocols and investigate the feasibility of a uniform IP agreement for our State colleges and universities.

DISCUSSION/FINDINGS

Easing Administrative Burden Relating to Intellectual Property (IP) Agreements

According to the focus groups, industries commonly tell academic researchers who are fellow collaborators: "I'm not going to tell you the secrets of my company before they are patented." As *Building Bridges I* pointed out, private industry must keep its own R&D efforts confidential to preserve trade secrets and maintain a competitive edge. *The Report of the Governor's Task Force on Higher Education* echoed this point, noting, "Achieving greater collaboration in research must be balanced with respect for the laws of intellectual property."[vi]

The contrasting goals of profit-driven companies and science-driven universities, however, cause constant IP ownership concerns for both parties, according to a participant from industry in the Chemicals focus group. Striving to release a product before their competitors, or to maximize their investment in a collaborative project, companies want quick returns. Unaccustomed to thinking as businesses do, schools are perceived as slow to

meet the deadlines of business to commercialize scientific discoveries. Another industry participant from the Chemicals focus group stated:

"One of the ways for a university to get a relationship with (our company) is to agree to our terms of IP ownership, which essentially means we will give you money to fund your collaborative research, but we own everything. We are not shy about it. Our chief technology officer firmly believes that is the right way to go, because the university is in the business of producing technology and the scientists of tomorrow. (Our company) is in the business of making money."

Participating in college internship programs also raises IP issues for companies, according to the focus groups. As long as students are working for the company, "they are employees..., even if maybe they *are* called interns," a participant from industry argued. "And as a consequence, the IP that they develop in that 10 weeks... belongs to the company."

University professors, however, object to corporate IP concerns taking precedence over academic priorities: "We can't have students have their dissertations blocked because the company decides it is intellectual property," one participant from academia told the Information Technology group.

To expedite and increase the ease with which collaborations can be facilitated, IP reform is imperative. Group participants gave examples of how they have used alternative agreements to manage IP issues. For instance, a participant from academia in the Biotechnology group said that by using cash-in-advance agreements, his institution of higher education can "give up as much (IP) as we can" to the industrial partner while setting up "a collaborative environment." In general, universities that have a flexible view of their role are easier to work with, the industry representatives in the groups suggested. For example, a participant from industry in the Biotechnology group urged collaborating universities to think of themselves as contract research organizations (CRO) that provide outsourced contract support services to a company. "One of the first things (a CRO) will tell you is that the IP that we have today remains with us," the participant said. "Everything that we develop in our work with you will be your idea. The company then says, 'Yeah, I can do that.'"

Given the prominence of IP concerns in industry-academia collaborations, IP reform should be viewed as a priority.

RECOMMENDATION 2

Master Contract Agreements should be developed and utilized to avoid repetitive negotiations and to increase the efficiency of the execution of collaboration agreements.

DISCUSSION/FINDINGS

Easing Administrative Burdens Via Master Contract Agreements

In addition to determining IP rights, negotiating virtually identical contract terms, particularly between long-time partners, is an undue burden that places the state at a competitive disadvantage when industry goes in search of an academic research partner. The focus groups said that repetitively re-negotiating the same terms over a series of transactions made collaboration difficult and costly. This shared complaint led to the suggestion of increasing the use of Master Agreements to streamline the contracting process and decrease its cost. In Master Agreements, the parties agree to the basic terms that will govern future transactions, only needing to add the specific details of the latest agreement. As an industry representative told the Pharmaceutical focus group: "Every time we have a new trial, we do a one-page amendment and we quickly start the trial a few days later (because we have a Master Agreement in place)." By shortening contract negotiation time for clinical trial agreements, investigators are able to open the study and begin recruiting research participants to achieve enrollment projections more quickly.

Like IP reform, Master Contract Agreements can ease administrative burdens that accompany the formation of partnerships, expediting collaborations.

Challenge 2

Lack of Coordination between New Jersey, Business and Academia

OVERVIEW: The three legs of the New Jersey innovation ecosystem – industry, academia and State government – often act without awareness of one another's activities. There is no unified vision for an innovation infrastructure; pockets of partnerships exist around the State, but they are ad hoc. The focus groups showed that the three partners must form a cohesive strategy that would help New Jersey capitalize on innovation's economic growth potential by promoting academic partnerships with private industry, encouraging innovation in our technology-driven economy, and increasing R&D funding at State colleges and universities. Without a cohesive plan, the likelihood is increased that a major New Jersey business could decide to expand into one of the rival states, aggressively pursuing an academia-business collaboration; such a setback would translate into a lost opportunity for New Jersey to gain revenue from new jobs and business expansion. It also could damage the ability of its colleges and universities to attract top research talent and dollars, and cause its businesses to fall behind other states in creating new products. This section advances the idea of marshalling the combined forces of industry, academia and the State government to establish labeled Centers of Excellence, set up industry consortiums and conferences, investigate ways to procure federal money and appoint a Council on Innovation. Additionally, working together the entities can focus expertise housed at specific institutions and resources to build a brand that will attract future industry collaboration.

RECOMMENDATION 3

The State needs to identify within its institutions of higher education the expertise and resources that could form the basis for Centers of Excellence. Designation of a single Center of Excellence for a specific research topic would focus on commercial sector progress, target resources and provide guidance to interested parties searching for a research partner. Additionally, the State should examine successful models in other states.

DISCUSSION/FINDINGS

Facilitating the Interface of New Jersey Industry, Academia and State Partners via Centers for Excellence

Although New Jersey has excellent resources, such as the Cancer Institute of New Jersey (CINJ) – one of 41 U.S. cancer treatment and research institutions designated by the National Cancer Institute, the State lacks designated "Centers of Excellence." Often located at colleges or universities, Centers of Excellence are State-labeled, authoritative sources for research, training and other work in a particular field. These facilities generally feature collaborations between the State, academia, industry, private venture capital companies and other private and public-sector parties. By being specifically labeled by the state as a Center of Excellence, resources are focused and designated to achieve collaboration in a certain area. Two of New Jersey's neighboring states, New York and Pennsylvania, currently utilize this model and consequently have a competitive advantage in the region to attract investment. Established to encourage rapid commercialization of scientific breakthroughs, New York's Centers of Excellence specialize in nanoelectronics, bioinformatics, photonics, environmental systems, wireless applications, and information technology, which directly compete with New Jersey's core industries.

New Jersey has the potential to quickly deploy this model and capitalize on the outstanding talent and infrastructure currently in place. Two examples of academic partners that could be targeted are:

The Cancer Institute of New Jersey (CINJ) includes 15 hospitals across the State that provide cancer care to more than one-third of New Jersey cancer patients. In addition to being one of 41 National Cancer Institute-designated research facilities in the country, each hospital within the CINJ network offers patients access to the latest cancer therapies and state-of-the-art cancer care. CINJ is the first and only multidisciplinary, medical school-based clinical cancer center in the State.[vii]

The Center for Advanced Food Technology (CAFT), a division of the Department of Food Science at Rutgers University, serves the food and affiliated industries through its research, training, education, extension and economic development activities. CAFT interfaces with industry and government to develop research on food quality, safety and health. Utilizing a manufacturing center, it has the ability to develop and make products for companies.

190 X

An industry representative from the Agriculture/Food Processing focus group recalled how the Rutgers Department of Food Science helped his friend, an aspiring bread-maker from Italy, transform his business plans into a viable New Jersey business. Planning to move to New Jersey and launch a bread-making plant here, the man was able to get help from the Department of Food Science in developing a bread recipe. Thanks to the mentoring he received (he also received funding by locating the business in a State business incubator), he eventually was able to open a bread-making plant in Southern New Jersey.

Facilities such as The Cancer Institute of New Jersey and Rutgers' Center for Advanced Food Technology are examples of how academia, industry and the State can work together to amass resources to facilitate future breakthroughs. As a participant from academia in the Transportation and Logistics focus group said, centers provide "a great avenue" for starting collaboration, especially given the current constraints on the State's higher education institutions. The State, industry and academia should work together to identify Centers of Excellence to focus resources for future collaboration in specific areas.

RECOMMENDATION 4

Academia, industry and the State should form consortiums dedicated to producing innovative ideas, products, services and to attracting increased federal funding.

DISCUSSION/FINDINGS

Facilitating the Interface of New Jersey Industry, Academia and State Partners via Industry Consortiums

In addition to Centers of Excellence, industry consortiums allow for the pooling of resources to advance a specific industry. Consortiums differ from Centers of Excellence in that they can be created by industry or other groups independent of or in partnership with an academic institution. The focus groups pointed out that while New Jersey has a number of consortiums, their focus tends to be generalized, rather than industry specific or R&D driven.

New Jersey is being surpassed by other states by not developing innovative groups to support industry. New Jersey would benefit by studying models from other regions which team up their Center of Excellence with their consortiums. For example, SEMATECH (standing for Semiconductor Manufacturing Technology), is an R&D consortium for the U.S. Semiconductor industry. SEMATECH partners with SUNY Albany's College of Nanoscale Science and Engineering, involving government, academic and industry partners. Together they are coordinating next generation research to continue U.S. innovation in semiconductor research. Including chipmakers, universities, government partners, equipment and material suppliers and research institutes, SEMATECH received $500 million in federal funding support over five years.

RECOMMENDATION 5

The State, industry and academia should work together to bring thriving and productive professional conferences to New Jersey.

DISCUSSION/FINDINGS

Facilitating the Interface of New Jersey Industry, Academia and State Partners via Industry Conferences

In recent years, economic conditions, downsizing of resources and minimized information sharing has constricted the ability of academic and industry professionals to interact. Travel restrictions, because of the economic downturn, have limited conference attendance, where in the past, successful relationship building occurred. The lack of this information exchange has stunted collaborative efforts. Several frustrations were expressed by focus group participants. An industry participant in the Information Technology focus group lamented the absence of relationship building, observing that the question that initially precedes one party's inviting another to explore a collaboration is: "Do we have a relationship?" Participants also have been disappointed by overly broad conference topics and redundant research presentations. While conferences used to be places where new and exciting information was heard and partnerships were formed, industry representatives feel as if "everyone takes the paper they did the previous year, and reworks it, then resubmits it." As we look to build a world-class innovation ecosystem, the State should work to recruit more professional conferences to showcase New Jersey's research assets and provide New Jersey researchers with greater networking opportunities.

RECOMMENDATION 6

In an era of reduced and increasingly competitive government funding, academia, industry and the State must combine their resources and efforts to attract increased federal dollars.

DISCUSSION/FINDINGS

Facilitating the Interface of New Jersey Industry, Academia and State Partners via Procuring Federal Money

The federal government's value in assisting innovative New Jersey collaborations cannot be overestimated. As a participant from academia in the Defense group put it: "The government's all about requirements and standards. If you get in early, then it is a lot quicker (to obtain available funding)." The federal government has to be included in any plan to increase New Jersey innovation.

As *Building Bridges I* pointed out, entrepreneurs active in the earliest stage start-ups in New Jersey usually have few funding options outside of federal Small Business Innovation Research (SBIR) and Advanced Technology Program (ATP) grants. SBIR encourages domestic small businesses to engage in Federal Research/Research and Development that has the potential for commercialization. Some states actually match SBIR funds dollar for dollar. ATP helps industry invest in longer-term, high risk research with payoffs beyond private profit. By sharing the cost with companies, ATP accelerates the development of early-stage, innovative technologies.[viii]

In addition to start-up funding, there needs to be a focus on joint partnerships to attract federal research dollars. As many grant applications now ask for supporting partners, businesses and academic institutions in New Jersey can benefit from working together. Leveraging combined resources increases the odds for a grant application to be approved.

RECOMMENDATION 7

The State should establish a Council on Innovation to advise the Governor, Legislature and other officials on ways to promote innovation and manage the innovation ecosystem.

DISCUSSION/FINDINGS

Facilitating the Interface of New Jersey Industry, Academia and State Partners via Creating a Council on Innovation

A state-sanctioned Council on Innovation can collectively engage members of academia, industry and the State government to develop and maintain an innovation ecosystem. Working together, they can propose policies that promote innovation, ensure that laws and regulations are consistent with the latest science and technology and do not pose obstacles to innovation progress. The Council will also help to identify emerging trends and technologies in business models.

Other states have already begun establishing state sanctioned Councils on Innovation. To remain competitive, New Jersey would benefit from studying and developing a Council on Innovation that is modeled on successful councils in other states. An example includes the Illinois Innovaton Council:

Illinois Innovation Council

In February 2011, Illinois Governor Pat Quinn created the Illinois Innovation Council to, "identify and advance strategies that accelerate innovation, economic growth, and job creation." Its duties are to promote the role and importance of innovation in economic development and quality of life; partner with academic, business and governments to improve support for innovation and align public and private resources; and attract innovation driven enterprises and individuals to Illinois in order to expand existing industry clusters and develop new ones. Additionally, it develops policies to cultivate and retain entrepreneurs, innovative researchers, and other enterprises; recommends criteria to measure, index, and communicate Illinois performance as a global source for innovation; and establishes grant or investment programs to support innovators from research institutions and entrepreneurs. [ix]

An initiative of the Illinois Innovation Council is the Illinois Innovation Network (IIN), a common platform through which startups, innovation-driven enterprises, service providers, research institutions, colleges, universities and community leaders connect, share ideas, and market tools and resources to accelerate the growth of businesses and industries in the Midwest.

Councils of Innovation can influence the next generation of technology innovation in a state, in addition to encouraging and promoting the latest technological advances.

192x

Challenge 3

Clashing Cultural Differences

OVERVIEW: Clashing cultural differences are inevitable in academia-industry collaborations. Academia pursues knowledge; industry, profit. As previously discussed, Deborah J. Jackson noted that two distinct economies comprise an innovation ecosystem, each driven by its own reward system. Thus, for the academic, it may be enough for a research effort to generate a scholarly paper that meets a university's tenure requirements. For a business, the goal is to commercialize a scientific breakthrough into saleable products. Complicating the connection between these groups, Jackson points out, is that the resources invested in the research must be derived from the commercial sector and government. As the focus group discussions demonstrated, these cultural differences were apparent as participants expressed their points of view.

RECOMMENDATION 8

For conducting industry research the State and institutions of higher education should review their tenure policies to incentivize and reward tenure-track faculty members in ways that are more in line with their peer institutions around the country.

DISCUSSION/FINDINGS

Bridging Cultural Differences Between Business and Academia via Tenure Reform

It was clear from the discussions that tenure policies at institutions of higher education create a divide between academia and business collaborations, as each party has its own timelines, priorities and incentives. For tenure-track faculty, it's publish or perish, leaving little time or incentive to engage in sponsored research until tenure has been achieved. Focus group participants claimed that tenure-track faculty members at some New Jersey colleges and universities avoid collaborating with industry because doing so brings no credit toward tenure. Tenure policies at institutions of higher education should be changed to provide credit for tenure-track faculty members who participate in industrial collaboration.

Support for the groups' argument that the tenure concept obstructs collaboration is found in *The Report of the Governor's Task Force on Higher Education*, which stated that several state policies hinder the ability of New Jersey's colleges and universities to compete for the best students and faculty with institutions in other states and in other countries. These policies include establishing a five-year period within which to achieve tenure under the State and County College Tenure Act. As the report points out, this short timeframe can make it difficult for emerging faculty members to establish the credentials needed to achieve tenure at the state colleges and at the county colleges. The statutory five-year time period is two years shorter than the national standard of seven years. Rutgers University, New Jersey Institute of Technology, and the University of Medicine and Dentistry of New Jersey, which are not subject to this law, have policies that grant tenure within seven years.[x] It is essential, regardless of tenure timeframes, that institutions encourage collaboration. *The Governor's Task Force on Higher Education* recommended that policies hindering the competitiveness of New Jersey's colleges and universities be eliminated, although that recommendation did not specifically mention policies governing tenure.

A participant from industry in the IT group urged the establishing of "metrics" that would enable a professor's participation in an industrial collaboration to meet a university's tenure requirement regarding research. Over time, this participant argued, "if it becomes the norm that the tenure committee evaluates the impact of the industrial collaboration, then it will become real, because behavior is driven by metrics."

Sustaining the innovation ecosystem requires that relationship building with faculty begin at an early stage in order to cultivate long lasting collaborative partnerships.

RECOMMENDATION 9

Academia and industry need to work together to design internship/co-op programs that provide maximum benefit to all stakeholders.

DISCUSSION/FINDINGS

Bridging Cultural Differences Between Business and Academia via Internships/Co-ops

Similar to how tenure policies impede relationship building, student internships/co-op programs can be adversely impacted by the cultural differences that exist between the calendars and timelines of academia or business. Students must often choose between classes, lab work and internship/co-op programs, when they should, in fact, be gaining experience from all three.

193x

While it is important that students fulfill their on-campus requirements, internships/co-op programs allow students to gain real-world experience and allow businesses to evaluate and recruit potential employees.

For instance, semester-based placement, examinations and course timetables at the student's university/college can clash with his or her internship work schedule, since the commercial world typically adheres to a fiscal year, calendar year, or project schedule. A student's internship may end before the project on which he or she is working is completed.

The focus groups readily acknowledged the important role that internships/co-ops play in preparing today's students to be tomorrow's innovation leaders, calling for the establishment of more of these programs at New Jersey colleges and universities. The focus groups emphasized, however, that internships/co-ops work best when blended with academic instruction. Combining an academic education with an internship produces well-rounded students who have both the technological knowledge and the communication and social skills needed to work in business, the group members said. It would be a mistake, one participant from a focus group declared, to give a student credit for an internship in place of a lab: "They need both (experiences)," the speaker said.

The focus groups cited Drexel University's 6-month internship co-op as a model for New Jersey's higher education institutions to follow copy. On the job eight hours a day, five days a week, entrusted with projects "vital to the day-to-day functioning of the workplace," [xi] Drexel co-op students sample up to three different positions within their chosen field of study. They can choose from more than 1,200 co-op employers in 41 states and 45 international locations, or conduct an independent search. The average six-month co-op salary is $15,808. Before graduation, the student can sample up to three different positions in his or her field of study.

The focus groups concluded that designing internships/co-ops capable of bridging cultural differences between academia and business requires academia to become more flexible to meeting the needs of business while maintaining academic standards. To that end, academia and industry should explore ways to design internships/co-ops that best serve the needs of academia and industry, as well as the student.

RECOMMENDATION 10

Academia should emphasize the teaching of interpersonal skills and provide basic business training for STEM majors to facilitate the translation of research from the lab into commercialized applications.

DISCUSSION/FINDINGS

Bridging Cultural Differences Between Business and Academia via Business and Interpersonal Skills

Many high-paying STEM jobs go unfilled as candidates lack the necessary technical skills, training or post-secondary degrees. As New Jersey competes globally, this skills gap is alarming. As academics and policymakers work to ensure that New Jersey has a steady pipeline of talent to support our high-tech, research intensive economy, it is imperative that our students have the technical and the scientific skills they need to compete in the global marketplace. More students need to be exposed to, and trained in, math and science to provide the workforce that New Jersey's innovator companies require. Another key step in developing the pipeline of talent to support the innovation ecosystem in addition to technical training, is the teaching of interpersonal skills. Students need to effectively interact as part of a team or within a business group. To paraphrase the focus group participants: It isn't enough for students to be good scientists; they must be proficient in interacting with people, as well.

An industry participant from the Chemicals group said that frequently "it is very difficult" to get technologically-savvy students "to interact well with different groups," thrusting attention on the need to help students develop these business and interpersonal skills. These skills also are at the heart of relationship-building, a preliminary phase in forming partnerships. For this reason, an industry participant from the Chemicals group said his organization often prefers to collaborate with universities respected for their ability to develop business and interpersonal skills, even though these institutions of higher education tend not to be strongly science-focused.

In *Building Bridges I* it was recommended that universities reconfigure their curricula to give science-based majors basic training in business skills to be able to translate their scientific research into commercialized applications. During discussions with the focus groups, this recommendation was reaffirmed that students in the sciences need business skills to take their research from the lab to the marketplace.

194x

What They Said

Our focus groups showed that potential collaborations between New Jersey's institutions of higher education and industry often end in frustration and disappointment, partly because universities and colleges fail to think sufficiently like commercial enterprises. Here is some of the focus group input on this and related issues.

On the State's continued support of New Jersey's network of business incubators

A participant from academia: "We have 90 companies in our technology business incubator, I guess maybe half of them are IT … The incubator has tremendous advantage because we are able to coach them and entice our faculty members so we go after federal funds as opposed to sort of relying on family investment or venture capital investment to get it going. … Reestablishing the state's incubator is a very important element for this conversation."

A participant from industry: "It is important in this economy to provide state funding to small entities like start-ups, but in particular incubators. Bring back funding for incubation with a strategy and a roadmap that allows the state to build the confidence of the citizenry that the money they are committing will have a long term impact, even in a short term economy."

On the clash of cultures

A participant from academia: "I keep telling the industry that they will get deliverables in December or May. It is impossible to get you something in October or March. It is just not going to happen."

A participant from academia: If a student spends part of his college education in an internship in industry, his or her contribution "has to start in September and end in December, or start in January and end in May. And that is how students see the world. They get a grade for this."

A participant from industry: "The folks that I represent are very hands-on. They want results, and (have) limited experience with academia."

A participant from academia: A communication plan must be created partly to accommodate companies that want to "micromanage" academic projects. "How often do you want to interface? It's setting that upfront."

On academia's slow pace in commercializing research

A participant from industry: "Often, things that academia is advertising are not ready to go into our products; and so, because of the timeframes we work within, we struggle to see the financial sense of committing to a development program where the university may want to just get it out and licensed, rather than develop it and put it into our products."

A participant from industry: "We do look at universities, but so much of what we see coming from universities is very preliminary; it's not ready to go into the field, and so far we have not been willing to pay to develop that technology to get it ready for the field."

A participant from academia: "Most of the papers that I have written would probably put my industry partners to sleep."

On the prominence of the profit motive in industry research

A participant from industry: The primary motivation for doing industrial research "used to be pure science. Now we are certainly more driven by the customers. … It is not Edisonian product research, but it is certainly industrial research, as opposed to academic research inside an industrial entity."

A participant from industry: The breakthroughs in the past several decades which have most benefited the economy stemmed from "very large scale corporate research and development." As a result, "we have walked ourselves into these stereotypes about what the university should and shouldn't do and what the industry should and shouldn't do."

A participant from industry: "Academia is centered around the success or failure of individual faculty … so they are not necessarily rewarded to have very broad holistic views…They tend to be very specialized."

A participant from industry: The company's year-long efforts to use faculty members in a project "was an absolute failure … it did not work because (of) the motivations of the faculty members. … the money was not there and … it was not worth their time because they could be doing other things. (We) went on to hire professional industry staff … because they are devoted to … solving real world industry problems and everyone gets a paycheck. They don't need to be teaching classes or any of that."

195X

Challenge 4

Raising Awareness of New Jersey's Academic Assets to the Business Community

OVERVIEW: The foundation of a successful, functioning innovation ecosystem is communication and transparency. Without them, none of the parties can cultivate a relationship or share their work or vision. As was demonstrated in *Building Bridges I*, research and resources at universities have little visibility, both inside and outside their respective organizations.

The focus groups re-affirmed that the lack of transparency of activities is one of the most significant challenges universities and companies face when it comes to initiating a partnership. A university's pharmaceutical expert may not know that the school's recent research ties in with a specific problem that is confounding a segment of New Jersey's life sciences industry. The chemicals industry may be looking for the next best chemical compound, but has no idea how to tap the expertise of university chemists. According to the focus groups, universities do an inadequate job of touting the knowledge and skills of their brightest stars, which make it difficult to develop collaborative relationships.

More aggressive marketing of academic resources would help break this communication logjam. To enhance communication and marketing, this section proposes that higher education institutions make their websites more user friendly, that universities and colleges conduct a public outreach campaign to promote their top talent and assets that they develop a resource guide to help facilitate collaborative projects, and that the three legs of the innovation ecosystem join forces to establish a database of university research and development efforts.

RECOMMENDATION 11

Academia should design user-friendly websites, to make it easier for businesses to find the resources they are seeking and to facilitate potential collaborations.

DISCUSSION/FINDINGS

Enhancing Communication and Marketing via User-Friendly Websites

It is important that college and university websites be easy to navigate to successfully guide potential collaborators to a specific researcher or resource. In the focus groups, participants from industry complained that they often were unable to find even basic contact information for a field expert on the websites of the state's colleges and universities. Even an academic in the energy group confirmed, "You can spend months going in circles." A user-friendly website would give visitors from industry fast, easy access to essential information and provide guidance on how to collaborate with the institution.

RECOMMENDATION 12

New Jersey should more aggressively promote its academic assets to attract potential collaborators and research dollars.

DISCUSSION/FINDINGS

Promoting New Jersey's Academic Assets

New Jersey should be more aggressive in promoting the assets of its higher education institutions as centers for collaboration and innovation. The declaration by a participant from industry in the Chemicals group that no New Jersey universities were on his "radar screen" should be viewed as a call to action by the state to tout its many excellent academic assets.

As *Building Bridges I* pointed out, the State has a vested interest in promoting business and higher education collaboration because it will help grow the economy. The State needs to take advantage of the valuable research dollars that are available and make sure that New Jersey gets its fair share. Increased research investment will generate high paying jobs and more tax revenue.

The focus groups offered multiple suggestions on ways to promote New Jersey's academic assets. An industry participant in the Biotechnology focus group suggested that faculty members participate in more public forums to present their research as a way to attract companies to New Jersey. As he stated, "Word gets out and you have companies coming." A participant from academia in the Agriculture/Food Processing group recommended using Internet-based promotional strategies to highlight work by New Jersey scholars that would attract potential industrial partners. An outreach, this speaker said, could be built around a question such as, "Did you know our school has the world's leading microbiology expert on Listeria?" Another participant in the Biotechnology group suggested traveling outside the State to promote why industries based elsewhere should collaborate with New Jersey higher education institutions. Another participant wanted the outreach to target New Jersey high schools, to motivate young scientists to pursue studies that could lead to eventual collaborations with industry.

196x

RECOMMENDATION 13

Academia, industry and the State should establish a comprehensive resource directory that includes existing research areas, capabilities and talent, and publicly available assets and facilities at New Jersey colleges and universities.

RECOMMENDATION 14

Each college and university should publicly promote its own chief administrator (i.e., Associate Provost for Research, Vice President for Research, Director of Research and Sponsored Programs, etc.) to serve as a one-stop-shop for business to access university information and resources.

DISCUSSION/FINDINGS

Develop Resource Tools to Guide Users Through Colleges' and Universities' Infrastructure

In order to facilitate the relationship building that is the underpinning of an innovation ecosystem, centralized sources of academic resources should be employed to make it easier for the business community to engage an academic partner. The present lack of dialogue between the three legs of the New Jersey innovation ecosystem results in minimal visibility of the resources that are available to potential collaborators. Businesses need a centralized point of contact within each college and university to handle their research requirements. A publicly accessible resource directory should include all of New Jersey's college and university chief administrators in charge of business outreach and research.

A comprehensive resource directory would include existing research areas, capabilities and talent and publicly available assets and facilities at New Jersey colleges and universities. This guide would serve as a roadmap for businesses to identify what each college and university has to offer. "NJ's industry doesn't know what academia is doing," one participant from academia in the Biotechnology group pointed out. However, as a participant from academia in the Defense group noted, "Even people who are working within areas of the university that are not so far apart … don't know what (the others) are doing."

State government could utilize this tool for business outreach and retention. As business attraction efforts become more competitive among states, this is an easy way to promote available assets and encourage businesses to locate in New Jersey.

Furthermore, a designated administrator at each college and university would provide a one-stop-shop for business to access university information and resources. In addition, the administrator could serve as the liaison for researchers to interface with the business community.

Moving the innovation ecosystem forward, this directory would allow the information exchange to occur more rapidly and lead to greater collaboration opportunities that could benefit the state and economy.

Suggestion Box

The focus groups offered numerous suggestions for boosting entrepreneurship in higher education. Some of the more thought-provoking ideas:

- Assign specially appointed "industry mentors" and grant-writing experts to help guide colleges and universities in their efforts to commercialize scholarly discoveries. "The reality is very few faculty want to work with industry," claimed one speaker.
- Partner faculty members with a business advisor who can provide guidance and help in applying research directly to industrial practice. "Academics are very naive as to how we actually get our technology translated … we don't really know what's going on," said a representative from higher education. The speaker said that the business advisor, a venture-capitalist with corporate connections, gave the university a modest amount of seed funding and other assistance "to at least bring us to a point where we have the … data to actually get a company excited."
- Have the State release unique and unused data-sets to the public so industry and academia can mine its collaboration potential.
- Make a greater outreach to high schools to motivate students to pursue studies that would lead them into collaboration with industry.
- Establish a way to reward faculty for creating industry-friendly patents. "Communication with faculty is a necessity to develop patents that might make companies interested," a participant said.

Continued on page 17

197x

Challenge 5

Lack of Coordinated Efforts to Secure Funding from Various Sources

OVERVIEW: There are two major issues related to funding. First, as previously recognized by Deborah Jackson, there is a weak coupling of the two economies that form the innovation ecosystem "because the resources invested in the research economy must be derived from the commercial sector." Operating on two different philosophies - science for science sake and science for profit, the two parties often clash.

The second issue is how to attract federal dollars. In a well coordinated effective innovation ecosystem all parties work in unison to procure federal grants. New Jersey needs to improve its coordination and ranking of university R&D funding from the federal government.

RECOMMENDATION 15

The State, academia and industry should find ways to improve coordination of their efforts to secure increased federal funding.

DISCUSSION/FINDINGS

Coordinating the Securing of Various Sources of Funding via Improved Communication

At a time of generally decreased public funding, it is important that all three parties of the innovation ecosystem band together in pursuit of increased federal funding. Since the State has not ranked in the top ten for National Institutes for Health, National Science Foundation, Centers for Disease Control, Department of Defense, Department of Energy and others, which provide millions in funding, it is critical to pool our research efforts in submitting grant applications that can attract large investments. A recent effort by the state to strengthen our public research universities and position them to better compete for federal dollars acknowledges that there is room for improvement. This participant from the Chemicals group made an eloquent case for industry, academia and the State pooling efforts to procure federal funding:

"What problem can we solve that's in the best interest to both of us that we have the resources to solve, and what do we need? … and what do we need in terms of funding and going together to do that? … We have failed in some instances to attract government funding because we're not broad enough. But we are starting to look at specific partnerships where we can say, … oh, wow, if we work together we now cover all the bases so (when) we put the proposal in for millions of dollars of government funding, we're more attractive and have a better chance of success."

The collaboration for federal dollars allows for relationship building outside of the client-provider arrangement, allowing for a peer-to-peer dynamic to occur.

The innovation ecosystem requires new ideas to be developed and exploration to occur. However, that is not without cost and there are several dynamics to the funding equation. The research relationship can be peer-to-peer (academic and business research team funded by government grant), client-provider (business hires academic research team), or noncollaborative (an entity does its own research with its own funding). In a collaboration between academia and industry, depending on the type of relationship, money issues can spark contention. A business may resent being seen chiefly as a university's personal banking machine; as one participant from the focus groups indicated, "We don't want you to just come to us for money." This was met by equal frustration from an academic: "Even though you funded the project, it doesn't mean that you own me." Partnering together for federal funding can not only increase dollars brought to New Jersey, but can also improve a peer-to-peer relationship between academia and business researchers.

For instance, according to a recent study by the National Center for Science and Engineering Statistics at the National Science Foundation, (InfoBrief, September 2012), New Jersey ranked second among the states in R&D performed and paid for by companies in 2008, at $17.331 billion, with pharmaceuticals accounting for 73% of this business R&D. Yet, according to statistics compiled by Research America, in 2011 New Jersey ranked 22nd in combined NIH, CDC and NSF funding. This disparity clearly illustrates the disconnect between New Jersey's institutions of higher education and the State's leading research-based industries and why New Jersey companies partner with schools outside of New Jersey who have made the investment to support industry.

198x

Conclusion

The search for the next great idea, process, product or technology is increasingly becoming a collective effort requiring government, industry and academia to pool their resources and work together. In return, all these stakeholders stand to benefit from their contributions. Industries get to profit from their latest invention; colleges and universities receive support to advance and license their research; and the State realizes increased economic activity and job creation. However, to reap these benefits, all three parties must unite to build and maintain a thorough and functional innovation ecosystem in which R&D can thrive.

New Jersey has all the pieces to have a world-class innovation ecosystem: strong research-based industries, outstanding academic institutions, a supportive state government, accessibility to capital, and a highly-educated workforce. The challenge is taking these disparate pieces and putting the innovation ecosystem puzzle together. It is promising that the participants in the focus groups, industry and academic alike, were able to agree on the shortcomings in New Jersey's innovation ecosystem and recognize the imperative to improve the system in order to be competitive with other states that have more fully developed their innovation ecosystems, particularly in leveraging their academic resources as economic development tools. These academic-based economic development tools can take many forms, all of which provide value. For the mature company, it can be tapping the intellectual expertise of a world-renown researcher to conduct sponsored research. For a start-up company, it can be an incubator that provides laboratory space and business mentoring. For others, it can be renting a piece of sophisticated equipment they could not afford to purchase to advance their research. But without these resources in-state, industry R&D can stall or business can look to collaborate with out-of-state academic institutions.

Many of the recommendations contained in this report do not require a large investment by our universities and colleges, but rather the commitment and leadership to change their cultures and imbue a sense of entrepreneurism in our higher education system. Streamlining administrative burdens, bridging the cultural differences between academia and industry, and improving communications and outreach to the business community are initiatives that New Jersey's universities and colleges can easily undertake, either individually or on a system-wide scale.

The broader recommendations – coordinating efforts and resources to establish New Jersey as the home of specific expertise (i.e., Centers of Excellence, developing industry consortiums) and maximizing New Jersey's share of federal grant dollars – need the support of the State as a full partner and promoter as all three members of New Jersey's innovation ecosystem strive to optimize the State's R&D assets to attract new public and private investment.

Research and development is a highly competitive area that produces an economic multiplier that all states and countries yearn for. Where once New Jersey was the uncontested leader, we now find ourselves in a national and worldwide fight for R&D investment. And as we see, companies are more than willing to invest in states that have high taxes and difficult-to-manage regulatory schemes because they have world-class academic institutions that provide a level of R&D support that outweighs the negative factors.

However, due to our long history as a global leader in R&D, New Jersey has built up a reservoir of resources to compete on the world stage, as long as the state can adapt to the new rules of the game. That means a new paradigm in which industry, academia and the State are partners in a fully functioning innovation ecosystem.

Suggestion Box

Continued from page 15

- Have universities become more conversant in business, specifically in writing business plans and dealing with different types of contracts to handle collaborative offers that don't involve grants. "I had to have a small business plan on how I would incorporate small businesses into the contracts that I had," recalled one speaker from academia. "The university kind of looked at me like…are you nuts? We don't have a small business plan. …We had won the contract and then all the sudden we had 30 days to produce a small business plan. Fortunately, I came from industry, where I have heard it all, so I was able to work with our lawyers."
- Study how universities in Europe are encouraged to do "service work" for an industry through resource centers, a concept that is neither strictly tied to the funding-driven model for academia, nor well-promoted in the United States.
- Give faculty members greater incentives to align their academic goals with those of industry. Faculty promotions, one speaker said, currently are based on "the amount of funding they get from the National Science Foundation or the National Institutes of Health," not on work with industry.
- Think ahead. As one speaker said: "Get New Jersey universities to think in terms of preparing our students to be tomorrow's scientists, so (they can deliver) what the industries are looking for, what are the companies looking for."

199x

Endnotes

i The New Jersey Higher Education Task Force, "The report of the governor's task force on higher education," December 2010

ii InnovationNJ website. Available: http://innovationnj.net/

iii Deborah J. Jackson, "What is an Innovation Ecosystem?" National Science Foundation, Arlington, Va. Available: http://www.erc-assoc.org/docs/innovation_ecosystem.pdf

iv http://president.rutgers.edu/public-remarks/speeches-and-writing/remarks-healthcare-institute-new-jersey

v National Research Council of the National Academies, "Government-industry partnerships for the development of new technologies summary report," 2003

vi The New Jersey Higher Education Task Force, "The report of the governor's task force on higher education," December 2010

vii CINJ website. Available: http://www.cinj.org/

viii www.atp.nist.gov/

ix www.illinoisinnovation.com

x The New Jersey Higher Education Task Force, "The report of the governor's task force on higher education," December 2010

xi Drexel University Co-op website. Available: www.drexel.edu/undergrad/coop/

200X

NJPRO

The New Jersey Policy Research Organization (NJPRO) Foundation is an independent affiliate of the New Jersey Business & Industry Association. NJPRO is New Jersey's leading policy organization conducting innovative, timely and practical research on issues of importance to New Jersey employers. Working with diverse interests, NJPRO sponsors and supports research in New Jersey through both public and private policy research institutes, universities, colleges and individuals.

NJPRO Foundation
102 West State Street
Trenton, NJ 08608

www.njprofoundation.org

2011x

InnovationNJ

November 2022

[Rowan University, Virtua Health roll out plans for new college]
Glassboro, NJ - According to Dawn Furnas, "Rowan University and Virtua Health kicked off 2022 with the announcement of their new, historic partnership. Now, they're offering more details about the venture. The organizations launched a website Nov. 7 for the new Virtua Health College of Medicine & Life Sciences of Rowan University, an initiative made possible by an $85 million gift from Virtua Health – the second-largest endowment in Rowan's history – and $125 million dedicated by the university. The new college will offer clinical studies as well as learning environments and aims to "improve the quality, experience and capabilities of health care for all people and advancing research for the discovery of new treatments."

[Who Are the STEM Workers Under Age 25? Technician Is a Common Job Among Young STEM Workers]
Washington DC - According to Lynda Laughlin, Anthony Martinez and Asiah Gayfield, "Jobs in the fields of science, technology, engineering and math (STEM) often require a bachelor's degree or higher, leaving few STEM opportunities for workers younger than 25 who shape the nation's future workforce. As a result, in 2021 workers between the ages of 16 and 24 made up 12.7% of total employment across all occupations but only 6.8% of all STEM workers (just under 800,000) in the United States. While less common, STEM opportunities for young workers without a college degree exist – mostly technician occupations – and are needed to meet future demand."

[NJIT Receives $3M Donation to Support Honors College Growth]
Newark, NJ - Pioneering venture capitalist John Martinson is donating $3 million to New Jersey Institute of Technology (NJIT), Newark, to broaden and deepen the curriculum and real-world experiences for top scholars at its Albert Dorman Honors College (ADHC) and throughout the university. The largest single gift in the 27 years of ADHC will enable the college to add two new educational tracks; triple the number of scholars in the Honors Summer Research Institute; more than double the number of scholars who study abroad; add internships and cooperative educational experiences; restructure its course offerings;

and create new opportunities for faculty affiliations in the college, according to ADHC Dean Louis Hamilton.

ITIF report finds Germany outscoring US, Italy, and Canada in Innovation Competitiveness

Washington DC - According to Jonathan Dillon, "A report from ITIF exploring the factors involved in ecosystem strength found that states in Germany generally perform better than states in the U.S., Italy, and Canada in terms of globalization, knowledge economy, and innovation capacity. The Index reported that the critical factors influencing an ecosystem are the quality of education (especially in STEM fields), public and private R&D investments, the range of highly trained R&D personnel, economic dynamism, and entrepreneurship. Based on these indicators, ITIF ranked Massachusetts, California, Baden-Württemberg, Berlin, and Washington as the leading regions for innovation competitiveness."

SSTI: Efforts abound to increase female participation in STEM

Columbus, OH - According to Jonathan Dillon, "As opportunities in science, technology, engineering and math (STEM) develop around the country, different inclusion programs are being put in place to increase participation for women in the field. SSTI previously released an article highlighting the lack of female participation in certain STEM careers, like computer science and engineering, despite tech industries growing in different cities around the country. This week's story focuses on different efforts that are in place to help turn that tide and increase women's participation in STEM fields and the results the efforts are having."

Aaron Price: More startups should start in N.J. — here's why

Trenton, NJ - New Jersey is a standout state for a number of reasons. It has the most diners in the world, the largest boardwalk in the world and is home to the best pizza in the world — sorry, New York! These facts give unique character to the Garden State, which we all know is home to the biggest and best things. Something you may not realize about New Jersey is that it is also the best state to start a tech startup, especially now.

Kean University Launches Learning Labs to Help Small Businesses Grow

Union, NJ - The New Jersey Small Business Development Center (SBDC) at Kean University recently held the first in a series of learning labs offering hands-on support to small business owners as they navigate state certification processes and other opportunities to develop their businesses. The first learning lab walked about a dozen small business owners and entrepreneurs through the New Jersey small business certification application as well as the applications to be certified as a minority-owned, woman-owned, veteran-owned and disabled veteran-owned business.

Princeton Plasma Physics Laboratory Showcasing Clean Fusion Energy Apprenticeships

Princeton, NJ - The Princeton Plasma Physics Laboratory (PPPL) is celebrating National Apprenticeship Week with informative and interactive events about becoming a paid PPPL apprentice and learning the skills to obtain nationally recognized credentials needed for a career as a clean energy fusion technician. PPPL's apprenticeship program – the nation's first registered apprenticeship program in fusion energy and engineering – is designed to equip the next generation of technicians with the skills necessary to help build and operate a fusion energy experiment. The program is an industry-driven high quality career pathway for high school graduates and veterans and takes four years to complete.