New Jersey

CSIT

Commission on Science, Innovation and Technology

Annual Report 2021

New Jersey CSIT
Commission on Science, Innovation and Technology

April 1, 2022

The Commission on Science, Innovation and Technology (CSIT) is committed to advancing the state's innovation ecosystem to create a stronger, fairer economy for all New Jerseyans by keeping our state at the forefront of scientific and technological advances. During 2021, CSIT implemented additional grant and technical assistance programs to foster innovation that support New Jersey entrepreneurs that participate in the federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. We launched a new Catalyst Seed Research and Development (R&D) Grant Program and a Clean Tech R&D Voucher Program and continued to collaborate with the New Jersey Economic Development Authority (NJEDA) and the New Jersey Board of Public Utilities (NJBPU) to support early-stage entrepreneurs in the clean tech / clean energy space.

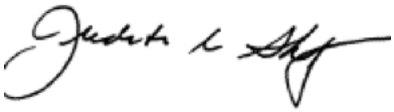
The response from the New Jersey entrepreneurial community to all these programs has been amazing. CSIT grant programs have been oversubscribed by up to 6X available funding. The vast majority of applicants to CSIT programs have five or fewer employees.

The analysis of the initial group of 13 companies that received CSIT SBIR/STTR Direct Financial Assistance awards in 2020 indicates positive job growth, an increased operational footprint in New Jersey, and follow-on third-party funding of over 16X the original CSIT awards of $375,000.

CSIT is committed to further developing and rolling out new programs aligned with the state's key strategic industrial sectors and encouraging collaboration and connectivity between industry and academia. We are transitioning the management of the ResearchWithNJ (RwNJ) portal from NJEDA to CSIT. The RwNJ portal currently provides information on over 5,000 NJ academic researcher profiles, 155 academic core facilities and over 260,000 research outputs.

The last year has been a challenging one on many dimensions and I am proud of the tenacity and accomplishments of New Jersey's innovation based life science, cleantech and technology entrepreneurs.

I thank each and every one of you for your contributions to developing and growing New Jersey's innovation economy.



Judith Sheft
CSIT Executive Director

New Jersey CSIT
Commission on Science, Innovation and Technology

April 1, 2022

From his first moments in office, Governor Phil Murphy has made creating the most diverse and inclusive innovation ecosystem in the nation and reclaiming New Jersey's role as a national leader in innovation key focal points of his administration. To that end, in late 2018, Governor Murphy re-established CSIT to bolster innovation within the Garden State and to enhance collaboration across and amongst the public sector, academia, and private industry.

At CSIT, we are committed to furthering the Governor's visions and creating opportunities for entrepreneurs, researchers, and technology businesses of all sizes.

During 2021, CSIT implemented a strong set of programs that will serve as the foundation for supporting New Jersey's innovation economy for years to come. As you will read within the following annual report, highlights from the past year included continuing the successful New Jersey SBIR/ STTR Direct Financial Assistance Program, continuing collaboration with the NJEDA as well as the NJBPU in the clean tech / clean energy space (via the creation of a seed grant program and a voucher program), and working on the transition of the RwNJ portal to be housed at and managed by CSIT.

I would like to thank the legislators, business and university leaders, scientists, and other public and private sector partners that comprise the CSIT Board for their hard work and dedication.

As we look ahead to 2022, and a post-COVID-19 landscape, CSIT's mission and work will be more important than ever. Please stay tuned for new programs and initiatives that will benefit businesses and researchers throughout the industry and the innovation economy in New Jersey.

Debbie Hart
CSIT Vice Chair

Governor Phil Murphy and the New Jersey Legislature re-established the New Jersey Commission on Science, Innovation and Technology (CSIT) in August 2018. The Commission 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 members include business leaders, university leaders, and scientists, along with representatives of the New Jersey Economic Development Authority (NJEDA), the Secretary of Higher Education, the Commissioner of Education, and members of the state Legislature.

MISSION

CSIT
is committed to
advancing innovation-based
economic development and job growth,
and to creating a stronger, fairer economy
for all New Jersey citizens by keeping the Garden
State at the forefront of scientific and technological
innovations. Innovation alone is not enough to drive sustained
economic activity. It requires the translation of innovation into
commercial application in the marketplace. This, in turn, results
in new firm formation and high wage jobs that can improve and
save lives and change the world for the better. Support for early-
stage entrepreneurs and innovation-based entrepreneurial companies
is a key underpinning to achieving a robust, diverse and inclusive
innovation economy.

CSIT links and leverages resources and collaborates with
other New Jersey agencies to implement programs and policies
to address the challenges faced by entrepreneurs, especially
gaps in services and support for early-stage startups
focused on technology commercialization with the
potential for high growth and
further investment.

PROGRAMS

SUPPORT AND COORDINATE activities to assist early stage science, innovation and technology entrepreneurs;

STIMULATE AND PROMOTE strong academic/industrial cooperation to accelerate the commercialization of new technologies from public and private research institutions;

ENCOURAGE AND PROPEL the development of scientific and technological programs in areas of strategic importance;

ENHANCE science, innovation and technology policy decision making at all levels of State government.

CSIT BOARD MEMBERS

VOTING MEMBERS

*PUBLIC MEMBERS APPOINTED BY GOVERNOR, BACKGROUND IN **SCIENCE/TECHNOLOGY***

Gunjan Doshi, Chair | *Founder and CEO, InRhythm (served through February 2022)*
Debbie Hart, Vice Chair | *President and CEO, BioNJ*
David Pascrell, Treasurer | *Co-Chair, Government and Regulatory Affairs, Gibbons P.C.*

*PUBLIC MEMBERS APPOINTED BY GOVERNOR WITH RECOMMENDATION OF SENATE PRESIDENT, BACKGROUND IN **SCIENCE/TECHNOLOGY, OR BUSINESS RELATED TO SCIENCE/TECHNOLOGY***

Dr. Joel Bloom | *President, NJIT*
Charlene Brown | *Retired AT&T New Jersey President*

*PUBLIC MEMBERS APPOINTED BY GOVERNOR WITH RECOMMENDATION OF SPEAKER OF ASSEMBLY, BACKGROUND IN **SCIENCE/TECHNOLOGY, OR BUSINESS RELATED TO SCIENCE/TECHNOLOGY***

Dr. Alain Kornhauser | *Professor, Operations Research & Financial Engineering / Director, Transportation Program, Princeton University*
Dr. Brian Bridges
Dr. Angelica Allen-McMillan
Tim Sullivan | *CEO, NJEDA, Ex-officio, or Designee*

NON-VOTING MEMBERS

MEMBERS OF THE SENATE APPOINTED BY THE PRESIDENT OF THE SENATE, EX-OFFICIO

The Honorable Paul Sarlo | *Democrat*
The Honorable Robert Singer | *Republican*

MEMBERS OF THE GENERAL ASSEMBLY APPOINTED BY THE SPEAKER OF THE GENERAL ASSEMBLY, EX-OFFICIO

The Honorable Andrew Zwicker | *Democrat (served through January 2022)*
The Honorable Christopher DePhillips | *Republican*

PRESIDENTS OF THE STATE'S PUBLIC AND PRIVATE RESEARCH INSTITUTIONS OF HIGHER EDUCATION, APPOINTED ANNUALLY BY THE GOVERNOR, EX-OFFICIO

Dr. Jonathan Holloway | *President, Rutgers University*
Dr. Nariman Farvardin | *President, Stevens Institute of Technology*

HIGHLIGHTS

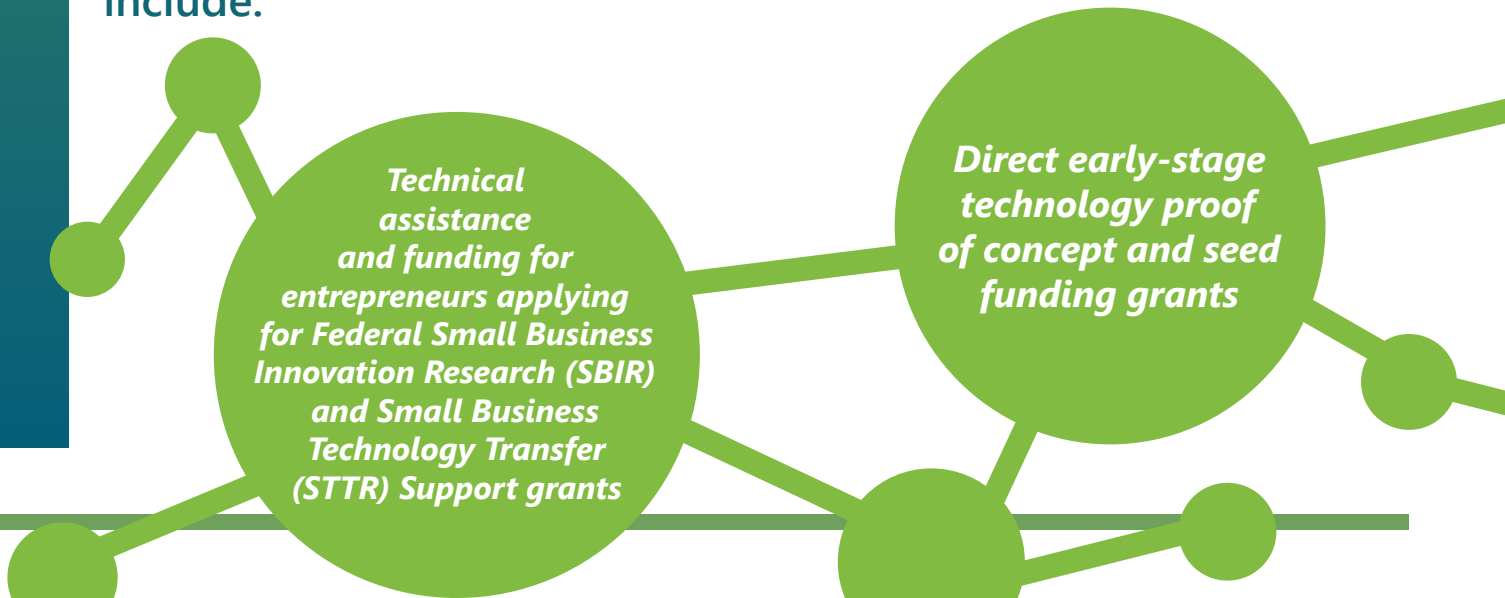
CSIT spent 2021 continuing to build momentum and expand its key grant and program initiatives focusing on the execution of its strategic vision to support emerging companies within New Jersey's innovation ecosystem.

CSIT is positioned to play a critical long-term role in supporting New Jersey's innovation economy as the state and the nation re-emerge from the COVID-19 pandemic and life sciences and technology businesses re-ignite their operations. CSIT focuses on supporting small early-stage innovation-life sciences, clean technology, and/or technology-enabled innovation intensive companies. The types of support that CSIT can deliver complement the other New Jersey state and federal financial incentive initiatives by assisting companies at their earliest stages of development.

Innovation will continue to be an important ingredient to the future success of the country as a driver of economic growth, national security, and the health and wellbeing of New Jerseyans. The programming and funding that CSIT offers fills an important need in this priority sector of the New Jersey economy.

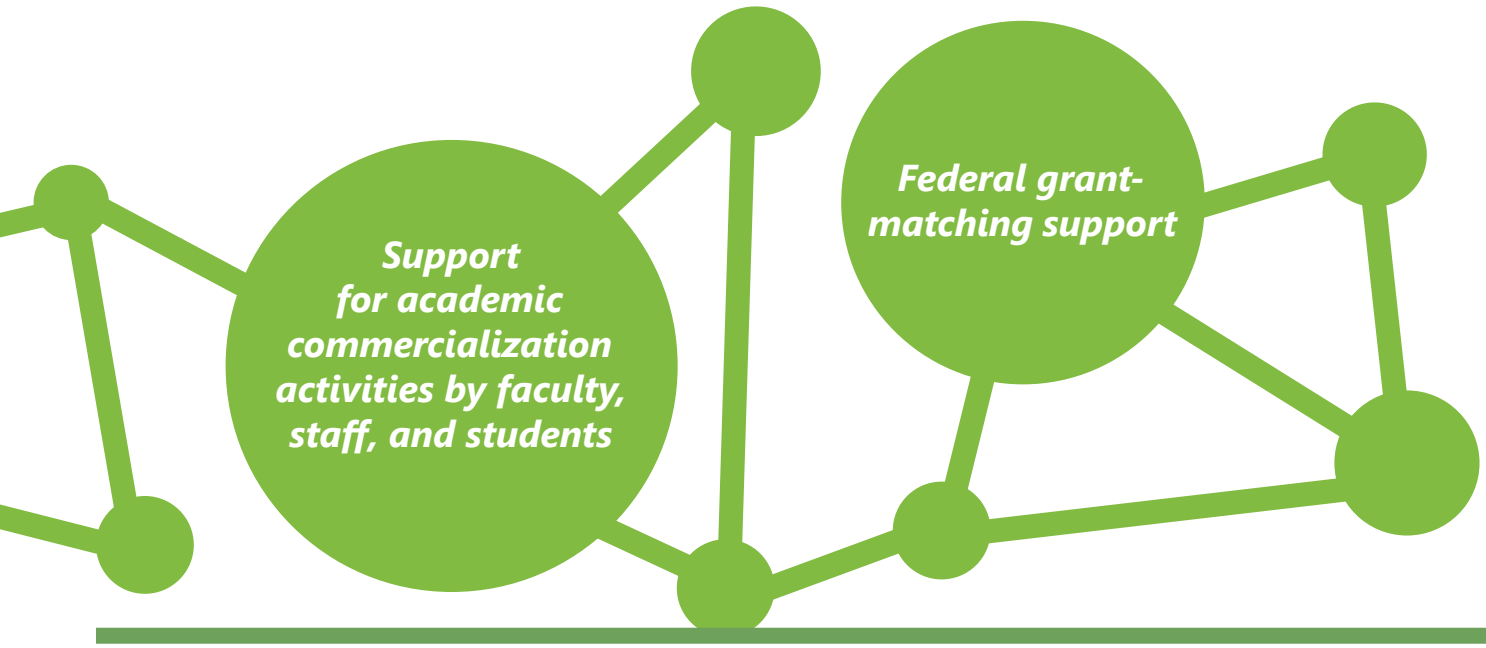
CSIT programs have been developed based on an analysis of innovation programs within the state identifying challenges and gaps in support faced by early-stage companies as they commercialize their innovations. CSIT regularly benchmarks neighboring state programs and metrics as additional input in program development and implementation. Emphasis is also placed on developing and implementing programs that drive increased academic industrial cooperation and accelerate the commercialization of new technologies from New Jersey's public and private research institutions.

Key gaps in the state's innovation ecosystem that CSIT addresses include:



It is important that New Jersey continues to provide a robust and flexible innovation infrastructure and ecosystem to sustain and grow the invention to innovation pipeline. CSIT is committed to ensuring that all New Jersey innovators are able to participate in the innovation economy. Governor Phil Murphy has prioritized creating the most diverse and inclusive innovation ecosystem in the nation and CSIT programming is in alignment with these diversity, equity and inclusion goals. In order to bring new ideas and innovations to the market and fuel New Jersey's recovery from the pandemic, everyone needs to be able to contribute. Consistent with this approach, a major pillar of all CSIT programs is increased intentional and targeted outreach to female and minority entrepreneurs and communities that have historically had limited participation in the innovation economy. Currently approximately 25 percent of the applicants to CSIT grant programs are self-identified female entrepreneurs, while less than 10 percent are underrepresented minority entrepreneurs. CSIT is continuing efforts to increase these participation percentages. In August 2021, the New Jersey Institute of Technology (NJIT) received a National Science Foundation (NSF) grant under the ADVANCE program to increase female and underrepresented minority participation in academic technology commercialization. CSIT is a co-principal investigator in the program implementation.

COVID-19 has had a significant impact on New Jersey's innovation economy, including innovators and entrepreneurs that receive support from CSIT. In addition to grant program financial assistance, CSIT has supported these entrepreneurs with direct one-on-one counseling and information, collaborative technical assistance programs, and webinars with other organizations. These initiatives have helped New Jersey entrepreneurs navigate the incentive landscape during the past year.



SBIR/STTR

In August 2021, CSIT launched the third round of the SBIR/STTR Direct Financial Assistance Support Grant program. In January of 2022, CSIT awarded 37 early-stage companies a total of $1,075,000, leveraging $18 million in federal funding. This is triple the number of awards since the SBIR/STTR Direct Financial Assistance Support program first launched in 2019. The companies in the third round were predominately in the life sciences, cleantechnology, or technology area, with their federal support coming from the NSF, the Department of Defense (DOD), the Department of Energy (DOE), and the National Institutes of Health (NIH). Seventy percent of these companies had five or fewer employees and 80 percent had 10 or fewer employees. Eleven (11) of the awardees had licensed technology from a New Jersey university. (See Appendix A for company descriptions).

Many of the federal agencies released new funding solicitations specifically related to COVID-19: prevention, detection, and treatment. At the same time, deadlines have been extended to allow awardees to complete work in challenging times with limited access to resources and facilities. Decisions on new awards have been delayed in some instances. These national trends have had an impact on New Jersey's startup and scaleup innovators that depend on federal funding. CSIT's SBIR/STTR Direct Financial Assistance program has continued to provide much-needed support, enabling the awardees to continue their development activity and retain staff.

During this period, CSIT has also worked with New Jersey startup and entrepreneurial ecosystem partners from the government, and the academic and private sectors on virtual initiatives (showcases and conferences) to help maintain the momentum of the state's innovation economy. The Commission signed several Memoranda of Understanding (MOU) to further these efforts.

Cleantech

In July 2021, the New Jersey Board of Public Utilities (NJBPU) entered into an MOU with the New Jersey Economic Development Authority (NJEDA) to provide an additional $2.5 million in funding from the NJBPU to the NJEDA to support early-stage, New Jersey-based cleantech companies. The NJBPU-supported program consists of a seed grant program focused on assisting local cleantech businesses during critical proof of concept and prototyping stages, empowering them to attract outside investors and begin generating revenue. The support also includes the creation of a research and development (R&D) asset mapping and voucher initiative to increase awareness, access, and utilization of the State's cleantech innovation-related assets.

Given the role of CSIT in working with universities and early-stage technology companies, in August 2021, the NJEDA and CSIT entered into an MOU to allocate funding of $2.375 million to CSIT to deploy a second and expanded phase of the cleantech innovation programs. The Cleantech Seed Grant Program began accepting applications in January 2022 and the expanded Cleantech R&D Voucher Program is expected to launch in the second quarter of 2022.

SBIR/STTR Technical Assistance Coaching

An analysis of federal SBIR/STTR awards by state shows that New Jersey is significantly lower in terms of awards and dollars obligated than neighboring states. Furthermore, there is an increasing demand from New Jersey early-stage innovation-based startups on learning about the federal SBIR/STTR program as evidenced by inquiries that CSIT has received. An evaluation by the federal Small Business Administration (SBA) of support programs in the SBIR/STTR space indicate that personalized and customized assistance coupled with generalized group training / workshops can increase the likelihood of success and improve outcomes through all phases of the SBIR/STTR process and beyond. To address this gap, in December 2021, CSIT entered into an MOU with the New Jersey Small Business Development Center (NJSBDC) to provide expanded SBIR/STTR coaching and mentoring support building on the existing NJSBDC technical commercialization assistance program.

ResearchWithNJ(RwNJ)

During 2021, CSIT worked collaboratively on transitioning the management of the ResearchWithNJ (RwNJ) platform to CSIT. In June 2017, the NJEDA and Office of the Secretary of Higher Education (OSHE) joined in partnership to develop RwNJ, a free, online database that provides public visibility to the experts, publications, equipment, academic profiles, etc. at five of New Jersey's major research universities – Montclair State University, the New Jersey Institute of Technology (NJIT), Princeton University, Rowan University and Rutgers – The State University of New Jersey. RwNJ helps entrepreneurs and researchers discover thousands of experts in science, technology, engineering, and mathematics (STEM), as well as their professional backgrounds, publications, and achievements. It also provides the accessibility to learn about various research departments and specializations of the five participating universities. The RwNJ portal has over 5,000 researcher profiles, descriptions on 155 academic core facilities and details on over 260,000 research outputs. By analyzing RwNJ usage data, universities are able to gain insights on the companies and countries that are searching RwNJ, along with top areas of interest.

Outreach/Communications

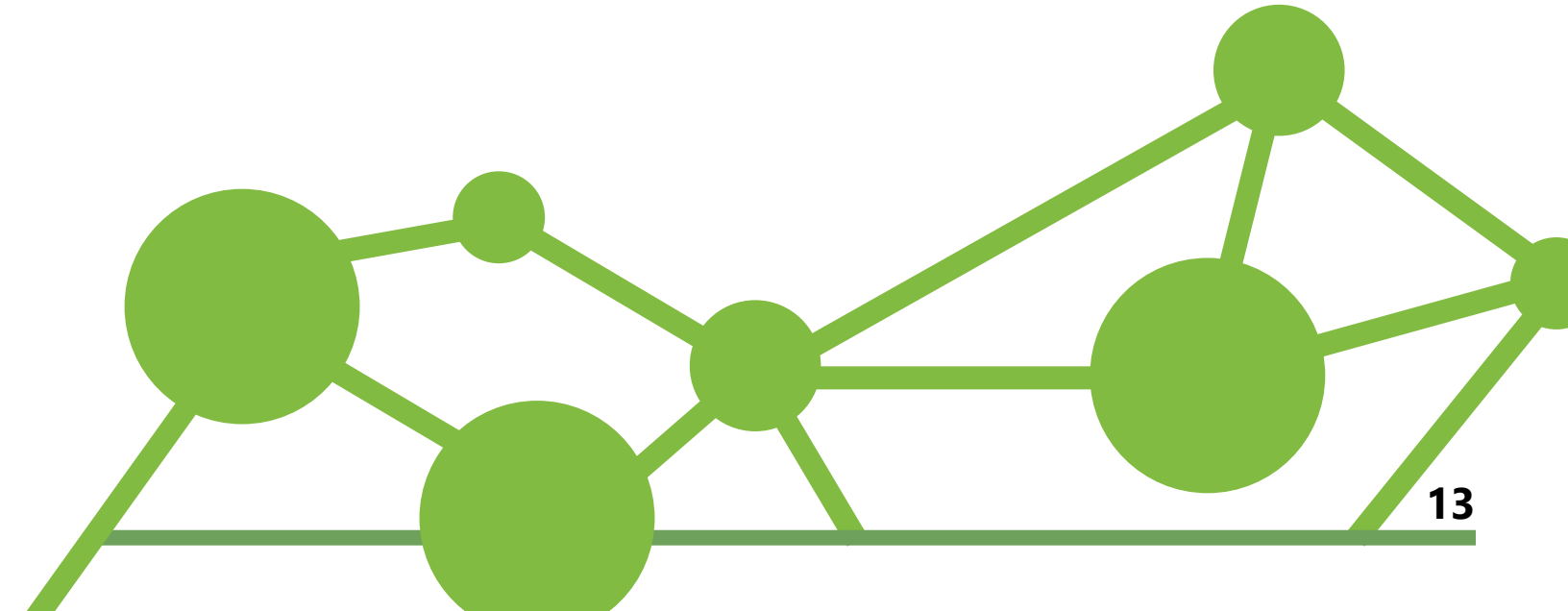
Throughout the year, CSIT has partnered with BioNJ, the New Jersey Business and Industry Association, local chambers, and university student entrepreneurial centers on training initiatives. CSIT has been collaborating with the NJEDA and the New Jersey Israel Commission on several international programs to increase the awareness of New Jersey innovators, entrepreneurs and startups to international funding and collaboration opportunities.

Communication and outreach have increased with #CSITInnovates, the Commission's new e-newsletter. CSIT is also working with the New Jersey Office of Information Technology to develop a robust, standalone CSIT website. Since COVID-19 resulted in CSIT Board meetings being held virtually, CSIT has implemented virtual tours of innovation resources in New Jersey (research locations, entrepreneurial hubs) to allow CSIT board members and the public the opportunity to connect with innovation resources and capabilities in the state.

Administration

On the administrative side, CSIT is continuing to implement grant management process improvements and standard operating policies. Online applications, enhanced applicant outreach, and information webinars were instituted to reduce challenges faced by applicants and provide opportunities to correct missing documentation, thereby reducing denials of applications. These concepts have been included in other CSIT grant programs, including Rounds 2 and 3 of the SBIR/STTR Direct Financial Assistance Program and cleantech initiatives. CSIT is bringing national best practices and new program concepts to New Jersey by participating in monthly federal SBA SBIR/STTR roundtable sessions.

When CSIT was re-established in 2018, CSIT and NJEDA entered into an initial MOU, which laid out the parameters by which the NJEDA provided support to CSIT in the areas of: administrative support and fiscal management. Having NJEDA continue to provide these services to the CSIT allows for greater operational efficiency and minimizes administrative waste compared to CSIT providing those programmatic, administrative, and facility support functions themselves. An amended MOU was entered into in September 2021 to update the chargeback mechanism to account for the increase in CSIT budget and programs.



KEY CSIT TIMELINE OF ACTIVITIES:

APRIL 2021

- Round 1 of the Clean Tech R&D Voucher Program launched
- Vice Chair (Debbie Hart) and Treasurer (David Pascrell) elected for third terms at CSIT's Annual Meeting

MAY – JUNE 2021

- SBIR/STTR workshops held (NSF/DoD)

MAY 2021 – MARCH 2022

- Bi-monthly-NJ university core laboratory facility meetings held
- New CSIT Seed Grant Program Concepts developed

JUNE 2021

- 10 Clean Tech Seed Grant awards awarded

AUGUST 2021

- Round 3 SBIR/STTR Direct Financial Support Grant program approved
- 2nd Clean Tech MOU between CSIT and NJEDA approved
- CSIT/NJEDA participate in Cleantech Open Northeast programs
- NSF ADVANCE Grant awarded

SEPTEMBER 2021

- Updated MOU between CSIT and NJEDA on administrative / financial support approved
- Funding for RwNJ approved

NOVEMBER 2021

- MOU between CSIT and NJ Small Business Development Center for SBIR Technical Assistance approved
- Catalyst Seed Grant program approved

DECEMBER 2021

- Catalyst Seed R&D Grant Program Applications opened

JANUARY 2022

- 37 awards for Round 3 of the SBIR/STTR Direct Financial Assistance Program approved
- Round 2 of the Clean Tech Seed Grant Pilot Program approved

FEBRUARY 2022

- Initial SBIR Workshop held with NJSBDC

CSIT SBIR/STTR Direct Financial Assistance Grant Program

In August 2021, CSIT ran a third round of the SBIR/STTR Direct Financial Assistance grant program. (See Appendix B for details on the federal SBIR/STTR programs.) This program addressed challenges faced by New Jersey innovation-based entrepreneurs and builds on CSIT's mission to creating a vibrant innovation economy by supporting high-potential innovation-based entrepreneurs. The program complements other programs, including the New Jersey Small Business Development Centers' (NJSBDC's) technology commercialization support.

The Direct Financial Assistance Grant Program provides Direct Financial Assistance Phase I grants of $25,000 to New Jersey small businesses that had received a federal Phase I SBIR/STTR awards and Bridge Funding Phase II grants of $50,000 to New Jersey small businesses that have successfully completed Phase I and have applied for Phase II of the Federal SBIR/STTR program. The program was targeted to provide thirty Direct Financial Assistance Phase I grants ($300,000) and ten Bridge Funding Phase II grants ($250,000) with a budget of $1,250,000.

CSIT SBIR/STTR Direct Financial Assistance Grant Program-Implementation Outcomes

A total of fifty-four (54) applications were received: Forty-five (45) Direct Funding Phase I Grants and nine (9) Bridge Funding Phase II Grants

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CSIT and NJEDA staff reviewed the applications for completeness and eligibility. A total of 17 applicants (14 Direct applicants and 3 Bridge applicants) were deemed ineligible based on not meeting the eligibility requirements or not completing the missing documentation request. The evaluation team scored the 37 complete and eligible applications and recommended funding all thirty-seven (37) applications, thirty-one (31) Direct Funding Grants and six (6) Bridge Funding Grants. (See Appendix A for company descriptions.) The CSIT Program Committee reviewed the applications and concurred with the funding recommendations. The CSIT Board approved the 37 awards at the January 2022 Board meeting.

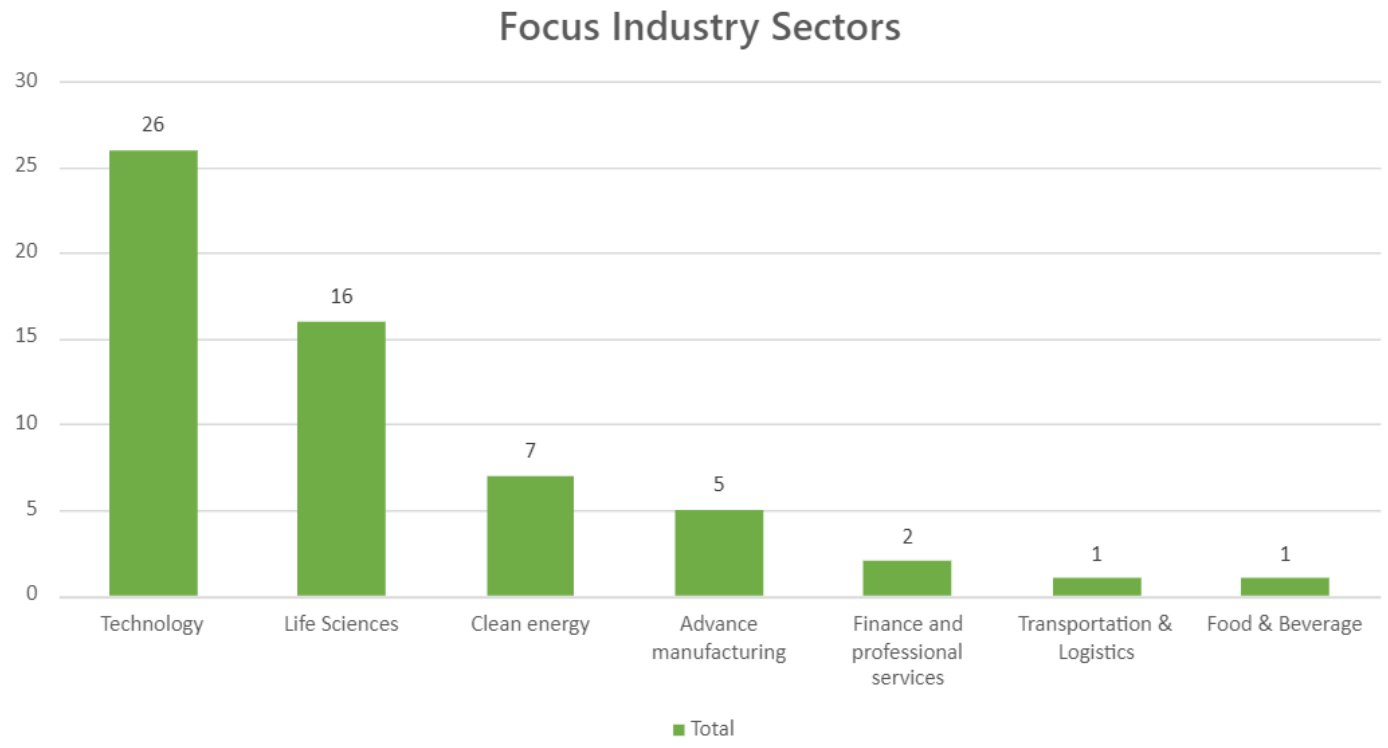
The applicants are predominately very small companies, with 70 percent having five or fewer employees and 89 percent having 10 or fewer employees. The awarded companies are located throughout the state, indicating that there is a base for innovation and economic development in every region of the state. Twenty-two (22) percent of Round 3 applicants are currently located in eligible Opportunity Zones.

SBIR/STTR: Takeaways (Successes)

Supporting Local Economic Growth

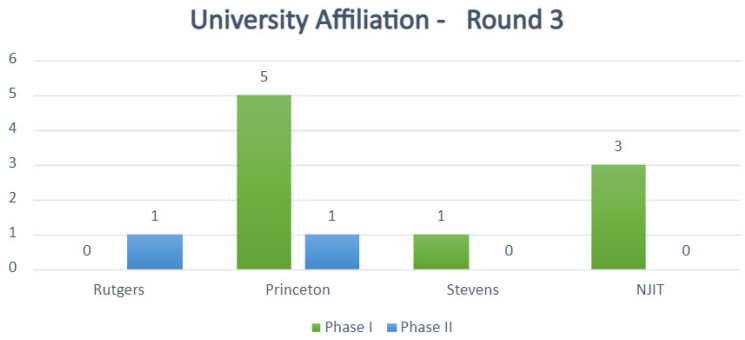
Legislative District	City/Towns	Total # of awards	Total Amount
4	Williamstown	1	$ 25,000.00
5	Camden	1	$ 25,000.00
7	Bordentown, Moorestown	3	$ 100,000.00
11	Eatontown	1	$ 50,000.00
13	Hazlet, Holmdel	2	$ 50,000.00
14	Hamilton	1	$ 25,000.00
16	Princeton, Princeton Junction, Skillman, Hillsborough	11	$ 350,000.00
20	Union	1	$ 25,000.00
21	Warren, Springfield	3	$ 75,000.00
22	Middlesex	1	$ 25,000.00
23	Bridgewater	1	$ 25,000.00
29	Newark	4	$ 125,000.00
33	Jersey City, Hoboken	3	$ 75,000.00
36	South Hackensack	1	$ 25,000.00
37	Fort Lee	2	$ 50,000.00
40	Cedar Grove	1	$ 25,000.00
Total Amount		37	$ 1,075,000.00

The companies had projects across a range of areas, with life sciences and technology having the highest followed by advanced manufacturing and cleantech. The supporting federal agencies include: DoD (13), NIH (13), NSF (7), DOE (2), the United States Department of Agriculture USDA (1) and the National Aeronautics and Space Administration (1). This is consistent with overall federal SBIR/STTR funding, where approximately 75 percent of the SBIR/STTR awards are given out by DOD and NIH.

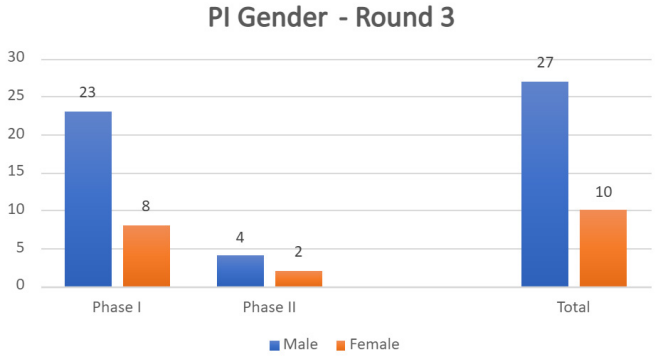


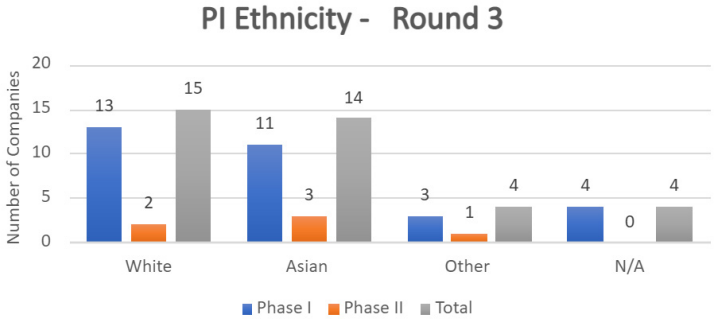
The third round of the program had many first-time SBIR/STTR applicants (74 percent Direct Financial Assistance Phase I and 16 percent Bridge Funding Phase II), which is in line with CSIT's objectives of increasing the number of successful applicants in the program.

Eleven (11) of the awardees had licensed technology from a New Jersey university, supporting CSIT's strategy of stimulating and promoting strong industrial-academic collaboration.



Gender, ethnic, and racial data were also collected on the principal investigators (PI) for the underlying federal SBIR/STTR awards. There was a slight increase in the percentage of female PIs to twenty-seven percent. The PIs were also predominately White and/or Asian.





Through three rounds of SBIR/STTR Direct Financial Assistance grant funding, a total of $1.9 million (Round 1 - $375,000, Round 2 - $450,000, and Round 3 - $1.075 million) was awarded to 66 (Round 1 -13, Round 2 - 16, Round 3 - 37) companies leveraging over $30 million in federal funding – 16X the CSIT awards. An analysis of the federal SBIR/STTR award database indicates that there are additional New Jersey companies that would be eligible to receive CSIT in future funding rounds. In Round 3, companies receiving awards are located in 16 of New Jersey's legislative districts. Since the program started in 2020, the number of awards per round has tripled from 13 to 37. Forty (40) percent of the 165 companies that have received federal SBIR/STTR Phase I awards since 2017 have received CSIT SBIR/STTR Direct Financial Assistance grants.

Economic Impact of SBIR/STTR Direct Financial Assistance Grants

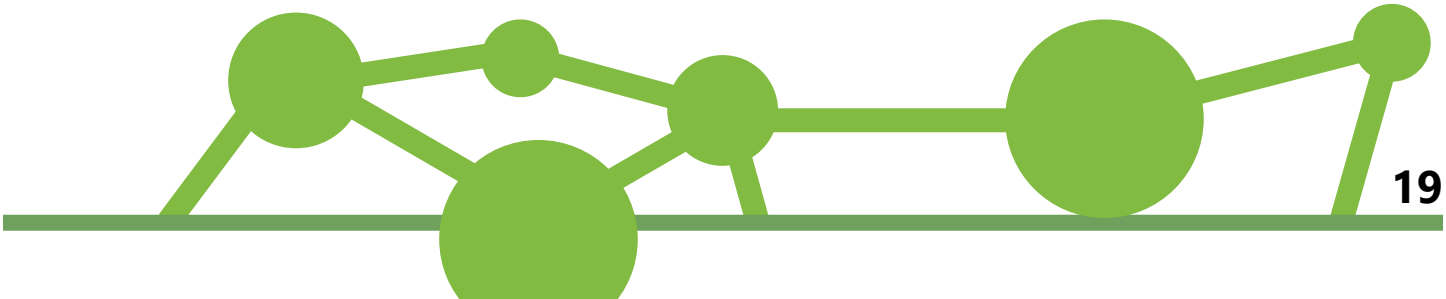
First year economic impact data has been received from the initial cohort of 13 companies that received CSIT SBIR/STTR Direct Financial Assistance Grants in June 2020.

- Sixty (60) percent of the companies (8) created a total of 24 new employment opportunities: 18 full time / two part-time and four interns. Fifteen (15) percent of the new employees hired were female. Other demographic data on race / ethnicity / veteran status was not reported.
- In total, 13 patents were received by six companies, which is one measure of validation of their innovations and technology development.
- Forty-six percent of the companies (6) expanded their physical office/lab space in New Jersey.
- Companies often need additional funding beyond the federal SBIR/STTR and CSIT Direct Financial Assistance Grants to continue their R&D, production, and commercialization activities. The companies reported obtaining 3rd party investments, additional grants and loans of over 16X the original CSIT awards of $375,000.

Catalyst Seed R&D Pilot Grant

In November 2021, CSIT approved a $1.5 million Catalyst Seed R&D Pilot modeled on the successful Clean Tech Seed R&D grant program. The Catalyst Seed R&D Grant program provides two levels of funding: $125,000 for companies conducting R&D for drug therapeutics and $75,000 for other R&D projects that are not in the clean tech space. Clean Tech R&D funding is available through a series of grant programs funded by the NJBPU discussed below. Eligible companies must have received less than $2M in 3rd party funding and have less than $500K in prior year's revenue. CSIT is targeting funding 15 companies under the Catalyst Seed Grant R&D Program.

The total number of applications received by the January 31, 2022 deadline is close to six times the number that can be funded, indicating a huge pent-up demand for R&D support from early-stage entrepreneurs that are engaged in R&D projects. The applications are 60 percent in the life sciences area: drug therapeutics and medical devices and 40 percent in the broad area of technology and social media. It is anticipated that funding awards for the Catalyst Seed R&D Pilot program will be made in 3Q 2022.



Cleantech Seed R&D Pilot Grant & Cleantech R&D Voucher Program

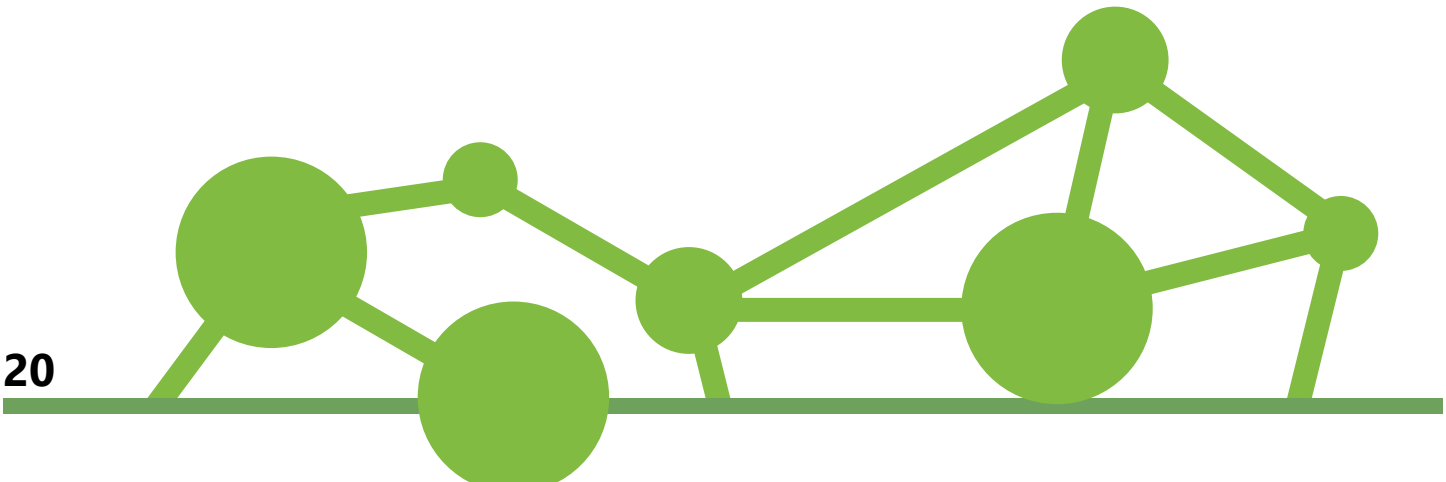
In Fiscal Year 2021, the NJBPU provided an initial funding of $1.25 million to NJEDA towards the roll out of (i) a Cleantech Seed Grant Program to support the R&D activities for very early-stage, New Jersey-based cleantech companies, and (ii) a Cleantech R&D asset mapping and voucher initiative to increase awareness, access, and utilization of the State's physical cleantech innovation-related assets such as testing equipment and specialized fabrication equipment.

In July 2021, NJBPU provided an additional $2.5 million to the NJEDA to launch the second phase of the Cleantech Seed Grant Pilot Program and expand the scope of the existing Cleantech R&D Voucher Program. CSIT and NJEDA have made significant progress in launching these programs.

The Cleantech Seed Grant Pilot Program provides grants of up to $75,000 each to early-stage cleantech companies for R&D projects that reduce or mitigate greenhouse emissions. Ten (10) awards were made at the June 2021 CSIT Board Meeting. (See Appendix C)

The Cleantech R&D asset map has been completed and available on the CSIT website, and interest in the program is steadily increasing. Unlike the Cleantech Seed Grant Pilot Program, the Cleantech R&D Voucher Program accepts applications on a rolling basis until the funds are depleted. This program is complementary to the Cleantech Seed Grant Program, as applicants typically tend to be early-stage companies looking for access to equipment and testing facilities to develop their first product prototype. Information on the companies that received Cleantech R&D Vouchers in Appendix D.

On September 30, 2021, CSIT, NJEDA, and NJBPU held a listening roundtable with selected cleantech entrepreneurs in what is intended to be the first of many continuing dialogues in effort to support NJ's innovative businesses. A follow-up survey and subsequent roundtable was held on January 28, 2022 with a focus on needs and challenges in scaling up prototypes and developing manufacturing resources. Input and feedback from entrepreneurs are critical as CSIT, NJEDA, NJBPU, the New Jersey Council on the Green Economy and other state partners are developing new programs and policies to spur the development and growth of the clean energy sector in NJ.



Looking Ahead

CSIT is positioned to play a critical long-term role in supporting New Jersey's innovation economy as the Garden State and the nation re-open from the pandemic and life sciences and technology-based businesses re-ignite their operations. The types of support that CSIT can deliver complement the other New Jersey state and federal incentive initiatives.

In January 2022, CSIT submitted a budget request for approximately $8.7 million for Fiscal Year 2023 to support the development and implementation of a variety of programs, including additional SBIR/STTR direct company support and technical assistance, two early-stage seed and voucher grant programs (Catalyst and Maternal & Infant Health), technology commercialization support for university spin outs, support for the RwNJ platform and innovation ecosystem events.

The estimated cash balance for CSIT through June 30, 2022 is shown below. As detailed in the table, approximately 90 percent of cumulative cash expenses will go to direct program support awards to entrepreneurs.

CSIT Sources & Uses of Funds

Available Cash Balance

Cumulative estimates through 6/30/22

APPROPRIATIONS	
FY19 – FY22	$7,700,000
PROGRAM COSTS	
CSIT Salary & Fringe /Health Benefits	$455,000
NJEDA Staff Chargeback	$160,000
Office, insurance, travel	$25,000
DAG Legal Expenses	$68,000
RwNJ	$300,000
Subtotal	$1,008,000
DISBURSEMENTS	
2020 Rd 1 SBIR/STTR Grants	$375,000
2021 Rd 2 SBIR/STTR Grants	$425,000
SBDC TA Support	$40,000
Subtotal	$840,000
TOTAL USES	$1,848,000
NET AVAILABLE CASH (12/30/21)	$5,852,000
PLANNED CSIT PROGRAMS	
2022 Rd 3 SBIR/STTR Grants	$1,075,000
Catalyst Seed R&D Grants	$3,000,000
Catalyst R&D Voucher	$275,000
Maternal & Infant Health Seed Grants	$500,000
Event Sponsorships / FAST Match	$150,000
Subtotal Add'l Programs	$5,000,000
Add'l Program Costs (est. 1/1/22 – 6/30/22)	$541,000
Subtotal add'l uses (Programs & Program Costs)	$5,541,000
Estimated NET AVAILABLE CASH (6/30/22)	$311,000

January 2022 Awardees – SBIR/STTR Direct Financial Assistance Applicant Profiles

Company	Description	# of Employees (at time of application)
	Direct Funding Grants: ($25,000 company)	
1Huddle Inc (Newark, Essex County)	1Huddle Inc. creates online game-based platforms that help sales companies train, onboard and retain new hires.	4
AG350, Inc. (Princeton, Mercer County)	AG350 creates assignment analytics platform intended to automatically grade assignments and provide feedback to students and teachers.	3
BioTillion, LLC (Skillman, Somerset County)	BioTillion is a hardware and software company that provides solutions for physical tracking of samples as well as methods for validating and tracking the cryogenic cold chain for each individual sample at ultra-low temperature.	8
Blue Rock Solutions Inc. (Williamstown, Gloucester County)	Blue Rock Solutions, Inc. is a small business, engineering consultant and innovation venture development firm that makes the installation of agricultural solar photovoltaics less costly and more economically viable.	1
Celestron Technologies, LLC (Moorestown, Burlington County)	Celestron Technologies specializes in electro-mechanical assemblies and mechatronic devices, which helps redesign existing electronic systems and implement concepts and ideas from required statements of work.	1
CloudJuncxion, Inc. (Bridgewater, Somerset County)	CloudJuncxion builds cloud security and advanced networking products for commercial and US Government customers.	4
Culnexin Therapeutics (Princeton Junction, Mercer County)	Culnexin Therapeutics is an early-stage therapeutics company that develops small molecule therapeutics against a novel target (‘oncogenic’ ubiquitin ligase), with applications in precision oncology, immuno-oncology as well combination therapy.	2
Dandelion Science Corp (Hoboken, Hudson County)	Dandelion Science Corp develops a digital therapeutics discovery platform using advanced computational graphics, computer vision, and neuroimaging technologies to help companies wishing to develop novel neuromodulatory therapeutics for many different types of indications.	4

Fabricated Software Inc. (Cedar Grove, Essex County)	FabSoft captures and manages of transactional documents. The company developed "Connection," a fully integrated software solution that involves the input, capture, distribution, and management of transactional documents across all points of business and from any source.	5
Generation Biotech (Princeton, Mercer County)	Generation Biotech develops tools for complex DNA analysis and continues to develop new technologies for the separation of genomic DNA, DNA-associated proteins, and specific cells. This helps advance the efforts of disease association studies, whole genome re-sequencing efforts, qualitative trait locus mapping and plant breeding.	4
HiT Nano, Inc (Bordentown, Burlington County)	HiT Nano develops novel and scalable synthesis technologies specifically needed for advanced manufacturing of functional materials and chemicals and aims for a low-cost manufacture and development procedure for all batteries and storage devices.	4
Impact Business Information Solutions Inc (Princeton, Mercer County)	Impact Business Information Solutions, Inc. develops software solutions for medical image data management for the life sciences (clinical trials) and develops solutions to facilitate remote execution of artificial intelligence/machine learning/deep learning algorithms for medical image data analysis.	5
InnoSepra, LLC (Middlesex, Middlesex County)	InnoSepra, LLC develops innovative technologies to reduce the carbon footprint of various operations such as carbon dioxide capture, renewable natural gas generation, and removal of legacy carbon dioxide from air.	6
Kathera Bioscience, Inc. (Union, Union County)	Kathera Bioscience develops broad spectrum small molecule antifungal drugs against new enzyme targets for which there are not currently U.S. Federal Drug Administration- or European Medicines Agency-approved drugs.	2
Knowledge To Own, Inc. (Springfield, Union County)	Knowledge to Own Inc. develops a homeownership service online platform that personalizes the home buying experience. The platform matches users to savings tools, access for sellers, lenders, and real estate professionals by providing consumers with a personalized match to consumers and high-quality, pre-screened leads to a network of affiliate partners.	2

Manhattan BioSolutions, LLC (Fort Lee, Bergen County)	Manhattan BioSolutions is focused on the development of biologic therapies that target microbial recognition and inflammatory signaling pathways for the treatment of advanced, metastatic cancers. They develop innovative tumor-targeted drugs that selectively seek and destroy cancer cells while sparing healthy tissues.	3
Marine Electric Systems, Inc. (South Hackensack, Bergen County)	Marine Electric Systems Inc. is a manufacturer of electrical and electromechanical components for the military by computer aided engineering, design and manufacturing in which they can supply electric systems configured to specific applications.	34
Mindprint Learning LLC (Princeton, Mercer County)	Mindprint is an online assessment and learning platform that identifies students` cognitive capabilities and provides individualized learning recommendations in math, English, study skills and social-emotional Learning. The company provides a computerized assessment and advanced algorithms to make teaching and learning recommendations individualized to a student`s cognitive profile.	6
Misram LLC (Holmdel, Monmouth County)	Misram LLC develops patented technology products in artificial intelligence and 5G mobile edge computing, which encompasses video analytics, distributed algorithms, and 5G wireless networking.	2
NanoSepex INC. (Newark, Essex County)	NanoSepex develops desalination technology for water reuse and treatment and their core technology is system design and process optimization.	2
NeuroTechR3, Inc. (Warren, Somerset County)	NeuroTechR3 develops personalized rehabilitation solutions using Exergame technologies for improving hand and arm functions in individuals suffering from the effects of brain injury and musculoskeletal impairments. The company aims to expand this field by providing reliable and accessible solutions for individuals with all types of neurological and orthopedic impairments.	5
One World Design and Manufacturing Group (Warren, Somerset County)	One World Design and Manufacturing Group designs healthcare products such as medical devices, medical packaging, anatomical models, patient aids and training kits and tools for healthcare professional education including surgical simulation manikins and task trainers.	34
Palindrome Technologies (Hazlet, Monmouth County)	Palindrome Technologies conducts cybersecurity research and provides cybersecurity consulting advisory services to commercial and government organizations.	4

Phoresis, Inc. (Princeton, Mercer County)	Phoresis develops a high-potential water purification technology from laboratory through design and pilot to full commercialization with its diffusiophoresis-with-CO2 technology that transforms the cost of providing drinking water for communities in low-income countries not connected to a distribution network.	1
RadioSight LLC. (Hoboken, Hudson County)	RadioSight is focused on R&D for a new imaging technology for tissue diagnostics and this imaging approach significantly improves the resolutions of millimeter-wave imaging systems to the level that is sufficient for diagnostic purposes. It will help address the current clinical need for an affordable imaging methodology that images the skin over its depth while offering large contrasts between normal, malignant, and benign tissues.	1
Regenosine, Inc (Jersey City, Hudson County)	Regenosine, develops first-in-class therapies for tissue regeneration. The purinergic system regulates and maintains tissue homeostasis. Their goal is to offer a disease modifying therapy with uncompromising efficacy relative to existing technologies.	2
Simphotek, Inc (Newark, Essex County)	Simphotek, Inc. has created a near real-time computational software called DOSIE which tailors light-based cancer treatments to each patient. During treatment in the clinic, there is a need to adjust the irradiance (light dose rate) and fluence (light dose) to account for patient-specific tissue and tumor properties and to account for changes in fiber placements that occur after an initial pretreatment plan is generated which is accomplished by its product.	3
Speckodyne Corporation (Hamilton, Mercer County)	Speckodyne advances innovation, research, and development in laser-based optical diagnostics. The company offers optical engineering services and solutions for optical diagnostics, based on advanced optical sensing, detection and imaging techniques and technologies.	1
StemPlant LLC (Camden, Camden County)	StemPlant LLC develops a new tool for surgeons to treat their peripheral artery disease patents. The company provides medical procedures that deliver stem cell infusions to locations within the human and medical procedures involving balloon catheters.	1
TEAM of Care Solutions, LLC (Fort Lee, Bergen County)	The TEAM of Care model uniquely combines best-practice operational processes with the most advanced healthcare technology platform in the world to deliver real-time, evidence-based medicine across a diverse TEAM of providers.	3

Tendo Technologies (Princeton, Mercer County)	Tendo Technologies provides solutions to accurately measure flow rate and pressure. With the use of novel Elastic Filament Velocimetry technology, Tendo's miniature sensor is able to detect extremely low flow rates with high precision and measure temperature. This technology is used to regulate pressure rates within building ventilation systems and accurately measure medication dosages.	5
Bridge Funding Grants: ($50,000 / company)		
BANC3 (Princeton, Mercer County)	BANC3 is a rapidly growing Command, Control, Communications, Computers Intelligence, Surveillance and Reconnaissance defense contractor whose core technical areas include Augmented Reality/ Electro-Optic Infrared (EOIR) Sensors /Sensor systems development/integration, software/hardware, and rapid prototyping of systems from initial concept through deployed system support. The company is focused on R&D to realize the tremendous potential of Augmented Reality in many applications, including Advanced Manufacturing, Transportation & Logistics, Healthcare, First Responders.	28
Cell Podium LLC (Newark, Essex County)	Cell Podium is an award-winning developer of patented m-health products and services for public health and emergency preparedness. Users of their mobile multimedia campaigns and augmented reality training include the Centers for Disease Control and Prevention, the Worker Training Program of the National Institute for Environmental Health Sciences, and the U.S. Air Force. Cell Podium is also broadcasting COVID-19 training modules to the cell phones of essential workers and measuring compliance.	1
Fuceltech Inc DBA Princeton Innotech (West Windsor, Mercer County)	Fuceltech DBA Princeton Innotech does research on high power VCSEL diode lasers and has an approach of using photonic crystal with the vertical-cavity surface-emitting lasers to make high power single mode beam. Eventually the approach would be able to coherently combine the photonic crystal-based diode laser array into a high-power single beam. The company is working in two technology areas: hydrogen-based power generation using fuel cells and high-power lasers for cutting, welding and military applications.	5

Princeton NuEnergy (Bordentown, Burlington County)	Princeton NuEnergy has developed a novel, low-cost, and acid-free direct battery recycling process for recycling and regenerating used lithium-ion batteries from electric vehicles, portable electronics, and other energy storage devices. This new technology involves a novel gas-phase process combined with solid-state reactions to heal and upgrade the battery materials, such as the cathode and anode.	4
SubUAS LLC (Hillsborough, Somerset County)	SubUAS develops a drone capable of swimming in water and flying in air, called the Naviator, which is able to operate in multiple domains. The Naviator platform can be used as a robust waterproof/weatherproof platform, or to conduct underwater missions. Applications include bridge/port inspections, oil-rig inspections, disaster relief, rescue operations, research data collection, and much more.	10
Venarum Medical, LLC (Eatontown, Monmouth County)	Venarum Medical is a privately-held company that develops medical devices using its patented integrated valve manufacturing process. The company's two leading devices are a prosthetic venous valve and a urinary incontinence device, both of which are catheter-delivered implants. Venarum's integrated valve process may enable commercial catheter-delivered valves with idealized flow conditions that address large unmet clinical needs.	9

APPENDIX B

Federal SBIR/STTR Background

The Federal Small Business Innovation Research (SBIR) and the Small Business Technology Transfer Program (STTR) are highly competitive three-phase award programs, which provide qualified small businesses opportunities to propose innovative ideas that meet the specific research and development (R&D) needs of the federal government. The programs were created to support scientific excellence and technological innovation through the investment of federal research funds in critical American priorities to build a strong national economy. The goals of the federal programs are to:

Stimulate technological innovation;

Meet federal R&D needs;

Foster and encourage participation in innovation and entrepreneurship by women and socially or economically disadvantaged populations;

Increase private-sector commercialization of innovations derived from federal R&D funding.

Congress established the SBIR program in 1982 and the STTR program ten years later to assist small business concerns (SBCs) in obtaining federal R&D funds to build a strong economy and support technological innovation.

SBIR/STTR targets the entrepreneurial sector because that is where most innovation and innovators thrive. However, the risk and expense of conducting serious R&D efforts are often beyond the means of many small businesses. By reserving a specific percentage of federal R&D funds for small businesses, SBIR protects the small business and enables it to compete on the same level as larger businesses. SBIR funds the critical startup and development stages and it encourages the commercialization of the technology, product, or service, which, in turn, stimulates the U.S. economy. Since its enactment in 1982, the SBIR program has helped thousands of small businesses to compete for federal R&D awards. Their contributions have enhanced the nation's defense, protected our environment, advanced health care, and improved our ability to manage information and manipulate data. Annually the SBIR/STTR award obligations are approximately $3 billion. In FY20, New Jersey companies received 132 SBIR/STTR awards totaling approximately $64 million.

SBIR: ***Requires federal agencies with extramural research/research & development (R/R&D) budgets over $100 million to set aside 3.2 percent of their annual extramural R/R&D budget for small businesses.***

STTR: ***Modeled after the SBIR program, STTR requires federal agencies with extramural budgets exceeding $1 billion to set aside 0.45 percent of their annual extramural R&D budget for small business concerns that work in cooperation with universities, federally funded R&D centers, and other non-profit scientific and educational institutions. The goal is to facilitate transfer of technology and research from these institutions to commercial use and encourage innovation.***

Phase I - Feasibility/ Proof of Concept
Up to $150,000
6-12 Months

Phase II - Full Research and Development
Up to $1 Million
Up to 2 years

Phase III - Commercialization
No SBIR/STTR funding
May take several years

Phase I – Feasibility/ Proof of Concept:
Using a competitive process, federal agencies award up to $150,000 to a small business to perform R/R&D for up to 6 to 12 months on a specific topic in order to establish its technical merit, feasibility, and commercial potential. During this phase, federal agencies assess both the performance of the small business and the potential of the technology prior to providing further federal support in Phase II.

Phase II – Full Research and Development:
Based on the results achieved in Phase I, federal agencies will decide whether to continue R/R&D efforts into Phase II based on the scientific, technical, and commercial merit and feasibility of the idea. If the federal agency decides to continue into Phase II, they will award up to $1 million to the small business to continue R/R&D efforts for up to 2 years.

Phase III - Commercialization:
No specific SBIR funding is associated with Phase III, however, some agencies may include follow-on non-SBIR funded R&D or production contracts for products or services intended for use by the U.S. government. The objective of Phase III is for the small business to pursue commercialization objectives resulting from the Phase I/II R/R&D activities.

APPENDIX C

June 2021 Awardees -Cleantech SEED Grant Applicant Profiles

Company	Description	# of Employees (at time of application)
Arbela Laboratories (Randolph, Morris County)	Arbela Labs is an early-stage company focused on increasing the scale and reducing the costs of biomanufacturing using its methanol-fed Pichia platform and end-to-end systems engineering. The company's goal is to economically produce proteins and other biomolecules for customers at unprecedented volume while enabling a revolution in protein production for human and animal nutrition without the environmental downside of current practices.	**1**
Andluca Technologies Inc. (Princeton, Mercer County)	Andluca Technologies is a spin-out of Princeton University that aims to significantly reduce the energy use of existing buildings via solar-powered smart glass systems. The Andluca team has shepherded an R&D breakthrough - transparent ultraviolet solar films for smart windows - from university discovery to granted U.S. patent to pilot integration with electrochromic glazing.	**7**
Eion NJ Corp (Princeton, Mercer County)	Eion Corp is developing a specialty fine-grained mineral material that rapidly captures and stores CO2 when applied to agricultural soils. The company has identified a unique strategy that has low startup and marginal costs, is permanent, verifiable, and certified organic. Eion Corp's innovation is use of chemical tracers to verify the CO2 drawdown for trading securitized carbon credits.	**1**
Farady Fuels (Short Hills, Essex County)	Farady Fuels is developing a novel-fuel cell using a solid oxide electrolyzer technology designed to help various industries such as steel and nuclear. The technology will aid with the production of green hydrogen and fuels, enabling clients to cut costs and help with the deep decarbonization of emissions.	**4**
Farm to Flame Energy (Kearny, Hudson County)	Farm to Flame Energy provides scalable, end-to-end electricity generation systems for communities in underdeveloped countries. The company is developing portable generators that utilize agricultural and residential wastes in a smokeless and carbon neutral process to provide power.	**8**

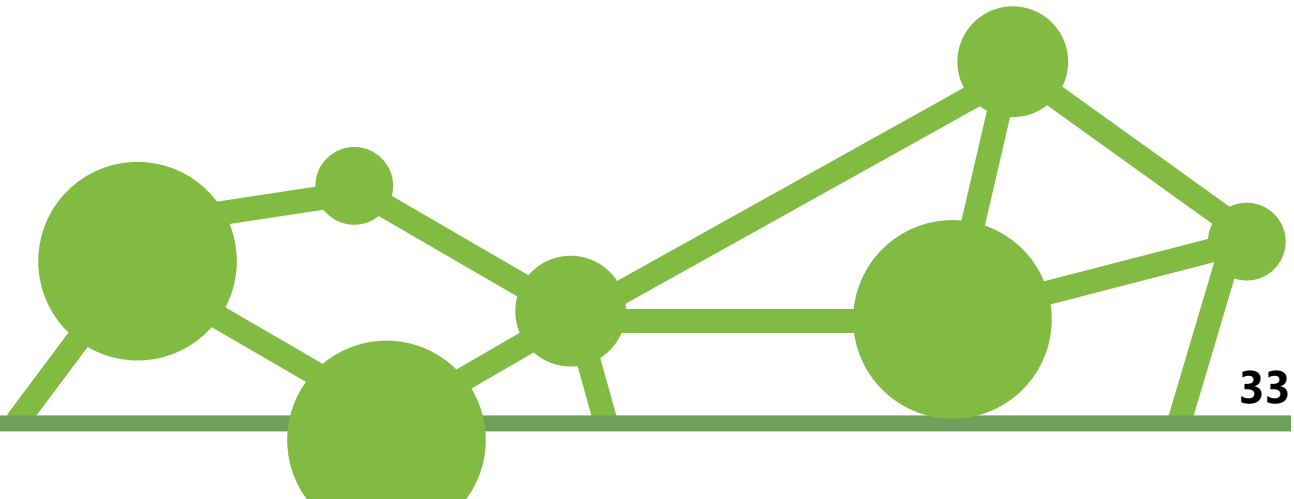
Green Blu (Hamilton, Mercer County)	GreenBlu aims to solve the toughest challenges facing desalination and wastewater, which are high electricity use and liquid waste discharge. GreenBlu's go-anywhere, modular, containerized distillers and ZLD crystallizers are highly efficient, cost-competitive, and completely changes the economics of waste brine by monetizing dissolved solids. The company's vapor adsorption distillation cycle powered by waste or solar heat achieves low operating cost by not using membranes and minimizing electricity use.	**6**
Princeton NuEnergy (Bordentown, Burlington County),	Princeton NuEnergy's mission is to create new solutions in renewable energy, alternative fuels, and environmental protection by generating novel processes and materials. Their current focus is on second-life battery solutions and closed-loop lithium-ion battery recycling to solve the issues of high cost and chemical pollution which traditional battery recycling methods suffer from.	**3**
RenewCO2, LLC (Cranford, Union County),	RenewCO2 is designing and developing technologies and equipment for the direct reduction of carbon dioxide into chemicals such as plastics precursors. Their technology uses only CO2, electricity from sources such as wind and solar, and water as the feedstock yielding plastics with an overall negative CO2 footprint.	**2**
SunRay Scientific, LLC (Eatontown, Monmouth County),	SunRay Scientific Inc. has pioneered and is bringing to market an environmentally clean electrical connection technology. The simplicity of SunRay's technology lowers production costs while speeding up production time, enabling bringing electronics manufacturing back to the USA. New generation customized conductive inks and epoxies address challenges of silver migration to allow for finer printing of printed electronics.	**16**
WeSolar CSP Inc (Princeton, Mercer County),	WeSolar CSP designs and builds scalable and modular Concentrated Solar Power (CSP) plants for energy and heating solutions for: Government, Utilities, Corporations, Industry, and Community/Micro-grids. Their system can generate 24 hours of electricity by employing long duration storage technology and enables high-temperature applications like green hydrogen production and process heat.	**12**

APPENDIX D

Cleantech Research & Development (R&D) Voucher Awardee profiles

Company	Description	# of Employees (at time of application)
4.0 Analytics, Inc. (Newark, Essex County, NJ)	To address climate change, 4.0 Analytics Inc. —a software and data analytics company focusing on vehicle engine and emission system diagnostics—developed an innovative solution, called Mechanic on Board®, which utilizes a telematics infrastructure to improve fuel efficiencies, reduce maintenance costs, and lower carbon emissions.	3
Brisea Group, Inc. (Parsippany, Morris County, NJ)	As an environmental engineering consultant firm, Brisea Group, Inc.'s main priority resides in providing assistance on and completing remediation projects. The company's in-house and associate consultants all have extensive experience and strong international project backgrounds in a variety of environmental engineering and energy fields.	7
Eion NJ Corp (Princeton, Mercer County, NJ)	Eion Corp is developing a specialty fine-grained mineral material that rapidly captures and stores CO2 when applied to agricultural soils. The company has identified a unique strategy that has low startup and marginal costs, is permanent, verifiable, and certified organic. Eion Corp's innovation is use of chemical tracers to verify the CO2 drawdown for trading securitized carbon credits.	2
HiT Nano, Inc. (Bordentown, Burlington County, NJ)	HiT Nano develops novel and scalable synthesis technologies specifically needed for advanced manufacturing of functional materials and chemicals and aims for a low-cost manufacture and development procedure for all batteries and storage devices.	4
iCheck Energy, LLC. (Fair Lawn, Bergen County, NJ)	iCheck Energy implements, distributes, and automates energy management solutions. By using IOT devices and software to interface between internal building management systems, IOT devices, Solar inverters and utility bills, they create goal-based energy management for commercial customers.	1

Michrinik Technologies, LLC. (Cedar Knolls, Morris County, NJ)	Michrinik' Technologies, Inc.'s mission is to research and commercialize the state of art, electrically superior Ultracapacitor technology using green and organic materials with applications in energy storage, grid storage, electric vehicles and charging systems.	1
Nanosepex, Inc. (Newark, Essex County, NJ)	NANOSEPEX INC. is a NJ based small business focusing on R&D of nanomaterial modified membranes and filtration systems for applications in water desalination, solvent recovery, solvent removal and zero liquid discharge for waste waters.	**2**
RRTC, Inc (Belle Mead, Somerset County, NJ)	RRTC is an advanced composite materials business, based on Low Temperature Solidification (LTS) technology. They are focused on expanding the technology base, generating intellectual property, and partnering with industry leading global companies to develop and commercialize new products enabled by LTS technology.	5



New Jersey
CSIT
Commission on Science,
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