The North Carolina Biotechnology Center

Report to the Joint Legislative Commission on Governmental Operations and the Fiscal Research Division

Contents of report:

- Prior State fiscal year program activities, objectives, and accomplishments.
- Prior State fiscal year itemized expenses and fund sources.
- Detail schedule of awards

Required by Section 15.17.(d) of Session Law 2015-241

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Submitting entity: The North Carolina Biotechnology Center

North Carolina Biotechnology Center
Report of Program Activities, Objectives, and Accomplishments
Fiscal Year Ending June 30, 2016

NCBiotech's vision is North Carolina: a global life science leader. The numbers continue to show the impact of the Biotech Center's activities. From 2012 to 2014, the state's life science employment grew by 6.6 percent – three times the national average. The state's 600-plus life science companies now employ 63,000, generating $73 billion in economic activity and $1.7 billion annually in state and local revenues.

During the 2016 fiscal year, NCBiotech formalized a strategy document that outlines the Biotech Center's approach to technology based economic development. The pillars are build community, develop partner networks, invest to catalyze innovation and company growth, and communicate the state's global life science brand. These pillars work to develop technologies, companies, sectors and regions for the benefit of North Carolina. The following document organizes NCBiotech's many activities in these development areas, adding a section of activities that develop and promote the state's life science ecosystem.

Company and Technology Development

NCBiotech invested a total of $7,478,637 million in fiscal year 2016, the majority of which supports technology development, company creation and company growth.

Catalyzing Company Growth

Taking products from lab to market requires innovative technology, talented entrepreneurs, timely access to capital, critical connections, and a supportive environment. NCBiotech's Business and Technology Development (BTD) program seeks out start-up companies with promising technologies and talented teams, provides funding to meet key business and product development milestones, and provides services to help the companies grow.

This comprehensive approach helps innovative life science companies in North Carolina attract the follow-on investment that leads to significant job growth. Since program inception, portfolio companies have received an average of $109 in follow-on funding from external sources for every $1 in business loans from NCBiotech. This has led to the creation of more than 3,500 North Carolina jobs within these portfolio companies, and many more in support companies.

Loan applications are reviewed by BTD's team of business and science experts, often with input from external experts, and are awarded by a subcommittee of NCBiotech's board of directors. Award totals for the 2015-16 fiscal year were:

- Company Inception Loan (6) $450,000
- Small Business Research Loan (10) $2,224,975
- Strategic Growth Loan (2) $1,000,000

Priming the innovation pipeline

NCBiotech also works prior to company formation, priming the innovation pipeline through research grants managed by its Science and Technology Development program. These grant programs are designed to build statewide research capacity, seed collaborations between companies and academic researchers, explore commercial applications of university innovations, and enable the licensing of these inventions to commercial interests.

For each $1 granted by NCBiotech, grant recipients have, on average, subsequently received an additional $28 in follow-on grant support, reflecting the strong leveraging impact of Biotech Center funding.

Grant applications are reviewed and evaluated by scientific experts in SciTech with input from external reviewers with relevant scientific and product development expertise. Awards are approved by a subcommittee of the NCBiotech board of directors. Grant awards totaling $3,266,439 were made in FY2016 and were allocated as follows:

- Institutional Development Grants (7) $1,204,696
- Collaborative Funding Grants (3) $300,000
- Biotechnology Innovation Grants (13) $1,291,116
- Technology Enhancement Grants (7) $470,627

Investing in Infrastructure

The Biotechnology Center's Bioscience Industrial Development team collaborates with North Carolina communities to attract life science economic development projects. In addition to providing industry-specific expertise and resources, NCBiotech also provides an Economic Development Award for project-related investments that provide sustainable benefit to the company and community. The awards up to $100,000 are linked to job creation and retention milestones. While no EDAs were awarded this year, letters of intent were written for $350,000.

A full list of NCBiotech funding is available at http://www.ncbiotech.org/past-awards.

Sector Development

This year, NCBiotech continued its work in agricultural biotechnology and bio defense. Development of the marine biotechnology sector continued via the Marine Biotech Center of Innovation. NCBiotech also ramped up the North Carolina Precision Medicine Initiative.

Marine Biotechnology

The Marine Biotech Center of Innovation, created by NCBiotech, continues to track assets and form partnerships in the Eastern part of the state. The MBCOI works with faculty from all the marine institutes to better understand where commercial opportunities exist. The most recent success was the Sandbar Oyster Company, founded by a UNC-Chapel Hill Institute for Marine Sciences faculty member and partnered with a local shellfish harvester. Sandbar makes a biodegradable surface on which oysters can grow. The technology could bring oysters back into the coastal marketplace. MBCOI has provided business planning support for Sandbar over the last two years. This culminated in a NC IDEA grant award of $50,000 to pilot the model in the waters off the NC coast.

In October 2015, the MBCOI, in partnership with NCBiotech's Southeastern Office, hosted the international BioMarine Business Conference in Wilmington. This annual international meeting, which is devoted to the commercial development of marine bioresources through business partnerships, was attended by over 200 representatives from 19 different countries and brought unprecedented attention to NC's marine biotechnology sector.

Bio Defense

NCBiotech has taken a broad view of this sector to bring more military, defense (DoD) and homeland security (DHS, BARDA) funding to North Carolina companies and universities. Life science applications include vaccines and novel technologies that will protect our soldiers, heal those who sustain wounds in battle, and protect the food supply.

The Bio Defense initiative leveraged the existing NCBiotech infrastructure to provide new loans and grants targeting Bio Defense applications with a total funding of **$375,000**. Loan investments went to Symmune, Indexus, Locus Biosciences, Mimetics, and Biomedomics. Duke University received three bio defense related awards, and two went to North Carolina State University. (These funding awards are reflected in previous grant and loan totals and are available on our website.)

The funding also enabled NCBiotech to produce these events, which all linked local researchers and companies with federal military and agency representatives:

- Medical, Biomedical and Biodefense: Support to the Warfighter Symposium (co-hosted with the NC Military Business Center)
- Workshop: Biomedical Science & Technology for Special Operations Forces (SOF) – Human Performance and Portable Lab Diagnostics
- National Defense University, Eisenhower School, U.S. Department of Defense Senior Service School, Biotechnology Industry Study Group and Agribusiness Industry Study Group
- NC Defense Business Association Science and Technology Committee Meeting (Coordinated by NCBiotech staff and hosted in partnership with the NCDBA.)

Center staff continued efforts to better connect NC life sciences to the defense sector by engaging and collaborating with many military support groups including the NC Military Business Center, the NC Military Foundation and the NC Defense Business Association. Additionally, the direct relationships that the Center staff has established with the defense, military and homeland security personnel have allowed several referrals for potential funding and collaboration opportunities.

Precision Medicine

Widely thought to be the future of healthcare in the United States, precision medicine tailors medical treatment to each patient, accounting for genetics, family history and environment. Ideally, precision medicine tools provide effective treatments for those who will benefit, but spare expense and side effects for those who will not.

North Carolina has significant assets and resources in precision medicine. Harnessing those assets will require a multidisciplinary team of a variety of stakeholders, including researchers, doctors, patients, providers (hospitals and ACOs) and payers (insurance). This year, NCBiotech, in partnership with Duke University's Center for Applied Genomics and

Precision Medicine, assembled a Precision Medicine Steering Committee. The committee includes NCBiotech, Duke, UNC, RENCI, GSK, Blue Cross and Blue Shield, RTI International, Pappas Ventures and the NC Department of Health and Human Services. The committee has begun to identify opportunities in precision medicine, drawing on the diverse strengths and interests of the team members.

Agricultural Biotechnology

Agriculture and agribusiness – food, fiber and forestry – generate $78 billion in annual revenues for North Carolina's economy. NCBiotech has positioned North Carolina as a global ag biotech leader by combining the state's biotechnology base with its agricultural assets. Market forces have slowed growth of the big global ag biotech firms and initiated a wave of consolidation. Mid-sized company growth and start-up activity will offset a portion of the large company moves during this fiscal year. Projections are similar for the next two years. Several successful recruitments added diversity to the sector through additional focus areas such as high-tech feed supplements, soil health, and plant microbiome.

Activities of the Ag Biotech Initiative are guided by the North Carolina AgBiotech Advisory Council, 16 leaders from industry, academia and government who meet three times annually. Key activities include:

- **Ag Biotech Entrepreneurial Showcase 2016** – This annual competition was expanded to Southeast and Mid-Atlantic entrepreneurs who pitched their companies' technologies for a cash prize. Half of the applicants were accepted to present at this international event.
- **Agricultural Bioscience Company and Entrepreneurial Profile System (AgBIOCEPS)** – This list catalogs 26 entrepreneurial companies in search of funding. The initiative team met with companies one-on-one to refocus this publication to better bring investment to North Carolina.
- **Biotechnology Crop Commercialization Center** – The BCCC accelerates crop development to meet critical industry needs. The BCCC deployed the final year of private funding ($748,314) from Golden LEAF Foundation, Murphy Brown LLC, North Carolina Pork Council, and United Sorghum Checkoff Program. This project increased Mid-Atlantic animal feed grain production to sustain profitability of the NC swine and poultry meat animal industry. The project was extended for two years with a USDA/BRDI Grant
- **AgBio[sphere]** – This place brand launched in 2014 to position North Carolina as the leading global hub for ag biosciences. The website design was updated to feature these assets and content from stakeholders. (www.agbiosphere.com)
- **NC Ag Biotech Professional Forum** – This professional networking forum welcomed attendees from more than 200 separate organizations. Six events are scheduled for 2016, and previous event attendance averaged 105.
- **Ag Industry in the Classroom** – This week-long program targets middle and high school ag and STEM teachers, providing a curriculum and tools focused on technology in agriculture. Seventy percent of the attendees are from rural counties. To date the program has reached more than 60,000 students.

State funding was supplemented by grants and sponsorships to achieve these outcomes.

Statewide development

Programs that develop technologies, companies and sectors, above, are applied statewide with the assistance of NCBiotech's regional offices. The offices' executive directors match regional strengths, life science technologies and NCBiotech programs to grow companies and technologies, developing economic drivers for each region.

In addition to developing companies and technologies within the state, NCBiotech works with statewide partners to bring life science companies to the state. With low business costs and specialized strengths in vaccine and pharmaceutical production, cancer research and medical research, North Carolina has a strong value proposition for companies looking to locate new facilities.

Regional offices

The regional offices collectively ensured the benefits of biotechnology – high paying jobs and economic growth – made their way to the regions. Several recruitment projects landed in North Carolina, attracted to regions that have been strengthened by efforts of the regional offices. Regional activities are guided by leaders from industry, academia and economic development, who meet quarterly to discuss strategy and tactics for each region.

Eastern Office

The Eastern Office is building on previous successes, including manufacturing facilities for Patheon, in Greenville, and Hospira, a Pfizer Company, in Rocky Mount. This year, Greenville's Mayne Pharma, formerly Metrics Contract Services, announced a $80 million facility expansion and 110 new jobs. D R Burton Healthcare Products LLC, makers of surgical and respiratory products, purchased their global headquarters facility in Farmville. The company is relocating its assembly and packaging operations to North Carolina, and it plans to move in additional manufacturing operations. The initial investment is $1.5 million and 25 new employees are forecast.

The office planned, designed and administered a commuting and mobility survey presentation with various pharmaceutical and life science related companies located east of Raleigh. The survey identified employee commuting patterns to the facilities. Responses were received from 12 companies, representing more than 7,100 employees. Results showed employees commuting from 49 counties. This represents a significant impact to the many rural counties represented across multiple regions of the state.

Greater Charlotte Office

In the fall of 2015, the Greater Charlotte Office worked with Medical Murray on its open house. This event was the culmination of several years of introductions, referrals and other interactions with the medical device developer and manufacturer. Medical Murray has been a strong partner in growing the region's medical device community, and the event showcased its new 6,000 square foot facility, the second expansion in just two short years.

This office continues its strong partnership with the North Carolina Research Campus, one of the region's most significant assets. The campus is home to three of the region's five exchange groups (see below). This year, as a result of a connection from the Biotech Center, the campus and Kannapolis participated in a life science exchange program to Tokyo and Singapore with the Center of International Understanding. The Greater Charlotte office also assumed leadership roles with several campus partners.

Piedmont Triad Office

The office worked this year to grow small companies and recruit established companies. One big win was SoBran Bioscience, a contract research provider of animal testing. Following its location in Greensboro, the company, in partnership with the Piedmont Triad Office, announced the Innovation to Impact prize. The goal is to advance technology commercialization by funding a preclinical study.

Entrepreneurial company SynShark is currently running a field test on five acres in Guilford County, thanks to the partnership of the Triad Office. SynShark won the 2015 Ag Biotech Entrepreneurial Showcase and is also an NCBiotech loan portfolio company. Synshark is just one example of approximately a dozen partnerships that the office helped to facilitate.

Outside of the Research Triangle Region, the Piedmont Triad has the state's most vibrant life science cluster. Based on the BIO/TEConomy report in June, the Piedmont Triad office worked to promote the Triad's strength to local partners and news outlets, as well as to global audiences via several international events in the region. Finally, the office continues its partnership with two strong workforce development programs at Forsyth Tech and Alamance community colleges.

Southeast Office

The Southeast Office worked on many projects related to company relocation/recruitment and expansion, as well as entrepreneurial venture creation. Projects included OptimaKV in Duplin County and Atlantic Biotechnology in New Hanover County. The office also initiated several company visits, relocations, and business line expansions to the UNCW MARBIONC Biotech Building.

As part of the NC Coast Clinical Research Initiative (Exchange Group, below), the Southeast Office continued its work to implement a clinical research workforce development program with UNCW's College of Health and Human Services. The program is funded initially by a $390,000 grant from Duke Energy, with significant matching support from UNCW.

As mentioned above, the Southeastern office was a co-host for the 2015 BioMarine Business Convention in October.

Western Office

The Western Office welcomed Jonathan Snover as executive director mid-year. Snover has extensive experience bringing new technologies to market in corporate, small business and startup environments.

In January, Raumedic, a German-based supplier of polymer components and systems for the medical and pharmaceutical industries, opened its North American headquarters in Mills River. The facility represents 56 new jobs and $11 million in investment, with expansion expected. Gaia Herbs, in Brevard, announced a $5 million expansion of its production facility and has been experiencing double digit growth in recent years. The region also initiated the Asheville Angels investment group, which has funded ten startups with a total investment of $550,000.

Bioscience Industrial Development

The Center's recruitment team continues to work closely with the new Economic Development Partnership of North Carolina (EDPNC) and the NC Department of Commerce on projects with new potential for job creation and investment. At the time of this report, 15 projects with more than 3,300 jobs and $1.2 billion of potential investment are being recruited. Significant news of the 2015-16 fiscal year:

- **Novo Nordisk** announced a $1.8 billion expansion in Johnston County. The project, the largest single manufacturing investment in state history, will double the Danish drugmaker's workforce in Johnston County by creating 700 new positions.
- India-based **Aurobindo Pharma USA, Inc.** will bring 275 new R&D and pharma-manufacturing jobs to Durham. The New Jersey-based generic pharmaceuticals maker plans to invest more than $31.7 million in a new state-of-the-art national headquarters for specialty pharmaceutical R&D.
- **Humacyte Inc.**, a regenerative medicine company based in Morrisville, will invest $38 million and create 115 jobs in a biomanufacturing facility in Durham County.
- **Grifols**, the Spain-based specialist in blood plasma products, will invest $210 million to build two new facilities at its Clayton campus in Johnston County.
- **Braeburn Pharmaceuticals**, a New Jersey-based developer of pill-free drugs for psychiatric disorders, announced plans for a manufacturing and development plant in Durham County, creating 52 jobs and investing $19.9 million over five years.
- Projects at **SoBran** and **Mayne** are discussed as part of the regional activities above.

Ecosystem Development

For a state to be a global leader in life science, it needs a strong, vibrant community to keep it moving forward. The sum total of technology, company, sector and regional development is an ecosystem or community that connects and grows the resources to support a global leader in life science.

NCBiotech produces a range of events and other activities to seed and grow this connected community. Events generally bring together a large number of people around a specific topic and include:

- Intellectual exchange groups connect academic and industry scientists who share common interests. The Center provides funding, meeting space, event management and/or bookkeeping services to these groups. In FY2016, 13 Center-sponsored IEGs convened 150 meetings, which attracted 4,590 attendees.
- A dozen regional exchange groups convened across the state on topics of interest to each region. Topics include clinical research, laser microscopy, genomics, and entrepreneurial and economic development.
- The NCBiotech Jobs Network welcomed hundreds of mid-career professionals and post-docs, as well as company and staffing agency recruiters over the course of the year. The network assisted in onsite company forums for Monsanto and BASF.
- The business and technology team develops relationships with technology scouts from large companies, then organizes strategic partnering meetings (33 in FY2016) to match company needs with North Carolina technology.

NCBiotech also makes many individual connections through its website, coaching sessions and other targeted activities, which this year included:

- Coaching and mentoring sessions – consultations between the business and technology team and company management to advise on critical company needs (68 in FY2016).
- Investor introductions – BTD develops relationships with investors and connects promising North Carolina life science companies to them. In FY2016 Center staff made 53 investor introductions.
- BATON - a network of more than 400 service providers (staffing agencies, accountants, attorneys, grant writers, etc.) committed to supporting startup companies, often at a discount. North Carolina entrepreneurs searched this database over 1100 times in FY2016.
- NCBiotech jobs board – 1,234 jobs were posted and 5,343 job seekers registered.
- Library lunch and learn events – 129 people attended these sessions designed to connect companies to the information available in the NCBiotech library.

This is in addition to a variety of local and regional events that showcase the Center's and North Carolina's strengths to the world. The largest was the North Carolina Pavilion at the Biotechnology Industry Organization's annual convention, this year in San Francisco. The Biotech Center worked with the Department of Commerce, EDPNC, Duke Energy, CRB and eight other sponsors to produce the pavilion, a recruitment dinner, and other promotional activities.

A community needs a location to gather, and NCBiotech's Hamner Conference Center provided that for nearly 1,500 meetings involving 33,755 people. These events involved intellectual exchanges, biotechnology industry education, corporate and nonprofit meetings and training events, and industry trade shows.

Hundreds of visitors also used the NCBiotech library's life science business resources. The library logged 144 research requests (a 27 percent increase) from external clients, in addition to ongoing service contracts with BD Technologies and PharmIntell. In all, 152 unique companies were served by the library.

Looking to the Future

NCBiotech has begun its 2017 fiscal year, and will continue maximizing state resources to create high-paying jobs for North Carolina. Already, promising companies fill our loan application pipeline. Technologies close to commercialization are being considered by our grants team. Existing work in bio defense and ag biotech will be augmented by a new team member to focus on personalized medicine. Regional initiatives, now in planning, will extend the impact of life science further into rural areas. And a new emphasis on global marketing, company recruitment and company retention will imprint North Carolina's brand around the world.

For the most up-to-date information on the Biotech Center, please visit our Web site, www.ncbiotech.org.

North Carolina Biotechnology Center
Report of Fund Sources and Expenses
Fiscal Year Ending June 30, 2016

Fund Sources:

Unrestricted Revenues	
State Appropriation	$13,600,338
Hamner Conference Center	483,535
Other, net	1,126,990
Restricted Revenues	
Contributions	336,224
Total Revenues	$15,547,087

Expenditures:

Science & Technology Development	$ 4,016,503
Business & Technology Development	3,325,515
AgBio initiatives	1,324,944
Statewide development	996,430
Bioscience industrial development	1,092,567
NC Bio pavilion	263,670
Biodefense	644,816
Centers of Innovation	511,638
Library services	1,251,206
Other Programs	131,986
Hamner conference center	666,916
General & Administrative	2,747,676
Total Expenditures	$16,973,867

Note: Figures above are on an accrual basis. The final quarterly report filed with the Department of Commerce is on a cash basis. This schedule will reconcile to our audited financial statements as of June 30, 2016.

North Carolina Biotechnology Center
Report of Awards by Program
Fiscal Year Ending June 30, 2016

Program Area Program Category	Record Count	Amount	Percent of Total
Business Financing			
Company Inception Loan	6	$ 450,000	6%
Small Business Research Loan	10	$2,224,975	30%
Strategic Growth Loan	2	$1,000,000	13%
Industrial Internship Program	12	$ 36,000	< 1%
Total Business Financing	30	$3,710,975	50%
Event Support			
Grantsmanship Training Grant	1	$ 5,000	< 1%
Biotechnology Event Sponsorships	22	$ 56,023	< 1%
Biotechnology Meeting Grants	7	$ 47,200	< 1%
Total Event Support	30	$ 108,223	1%
Research and Equipment Support			
Biotechnology Innovation Grant	13	$ 1,291,116	17%
Collaborative Funding Grant	3	$ 300,000	4%
Institutional Development Grant	7	$ 1,204,696	16%
Technology Enhancement Grant	7	$ 468,627	6%
Total Research and Equipment Support	24	$ 3,264,439	44%
Sector and Region Support			
Center of Innovation	1	$ 350,000	5%
Presidential Initiative Award	1	$ 45,000	< 1%
Total Sector and Region Support	3	$ 395,000	5%
Grant Totals	**82**	**$7,478,637**	**100%**