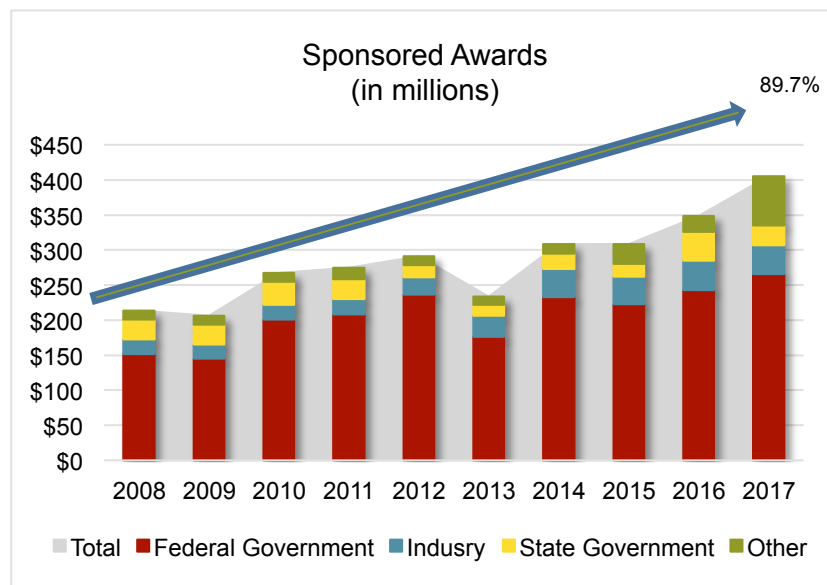
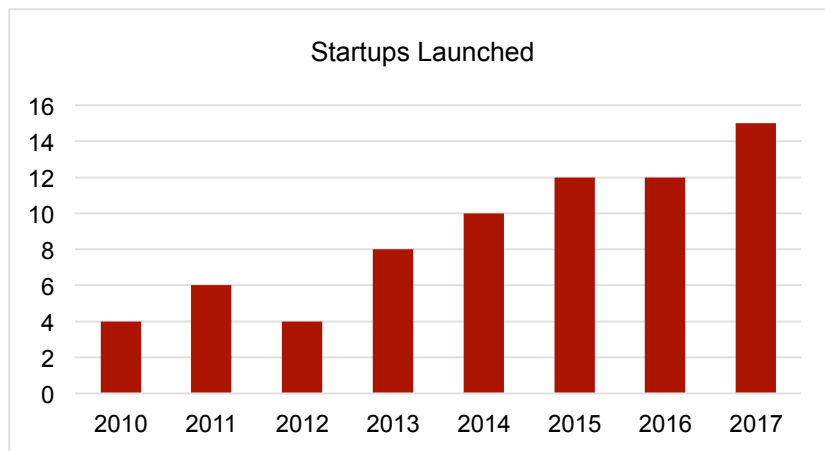
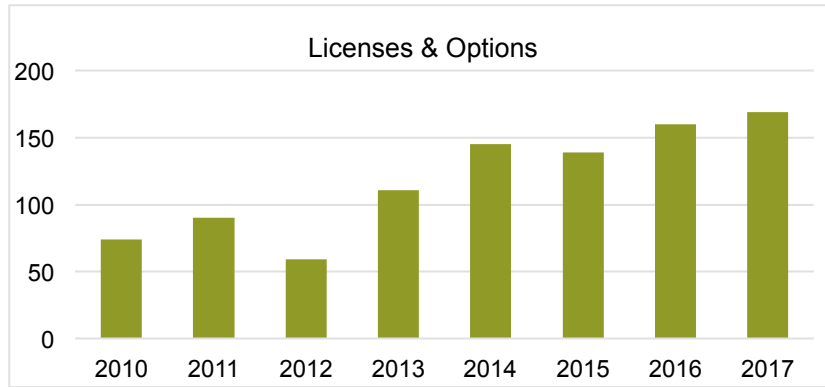


Annual Report FY2017

EXECUTIVE SUMMARY/HIGHLIGHTS

Our office focuses on building excellence in research through supporting the recruitment of excellent faculty and students, facilitating faculty development in research/scholarship, improving infrastructure and processes, translating research into new products and companies, and fostering partnerships and collaborations. This year NC State faculty and research administrators submitted 3,425 proposals valued at \$1.31B in total funding requests. NC State received \$405M in extramural research awards, a historical high, to be dispersed over multiple years to 2,830 projects. The Proposal Development Unit (PDU) supported the development and submission of 44 large-scale, interdisciplinary team proposals that resulted in \$29.9M in awards with another \$102.3M requested still pending. Since 2008, NC State total research awards have increased by 89.7%. All time records were also achieved in technology commercialization and innovation with 169 licenses and options agreements executed and 15 new start up companies launched.





All of this was achieved while NC State continued to strengthen its partnerships with the public, government, and private sectors. This year Centennial Campus Partners opened 13 new offices bringing the total number of Partner employees on campus to 4610, a 29% increase from last year. The Office of Partnerships and Economic Development (OPED) facilitated the signing of a Memorandum of Understanding (MOU) between NC State and the City of Raleigh to collaborate on smart city initiatives. OPED also assisted in 60 North Carolina economic development projects, an increase of 20% from the previous year.

ALIGNMENT WITH THE UNIVERSITY'S STRATEGIC PLAN

1. Enhance the Success of Our Students through Educational Innovation

Data Matters: Data Science Short Course Series

The Data Science Initiative (DSI) created a series of one- and two-day classes in partnership with the Odum Institute for Research in Social Science and the National Consortium for Data Science (NCDS). The week-long series of nine courses, held prior to the start of the fall semester, provided faculty, students, staff, and researchers an opportunity to enhance their skills in data analytics. Enrollment exceeded expectations with 146 attendees, mostly graduate students. The series was such a success it is being continued in FY2018.

Partnering with Merck to Support MBA International Challenge

The Office of Partnerships and Economic Development (OPED) successfully brokered an unrestricted gift from Merck to the Poole College of Management to establish the [NC State Grand Business Challenge](#). The gift, valued at \$100,000/year for five years, enables the Poole College of Management to host an international challenge for MBA students, addressing challenges faced by the critical and highly competitive pharmaceutical industry.

Centennial Campus Career Fair and Internships

For the third year, Office of Partnerships and Economic Development (OPED) hosted the Centennial Campus Career Fair that provides a platform for our Centennial Campus Partners to market their internship and full-time job openings to NC State students. In FY2017, 300 NC State students were hired as interns and full-time employees at Centennial Campus Partner companies.

2. Enhance Scholarship and Research by Investing in Faculty and Infrastructure***Established Research Core Facilities***

ORIED collaborated with the Provost Office and university leaders to establish NC State core research facilities. Establishing and supporting core research facilities will increase NC State's competitiveness in research proposals and aid in recruitment and retention of outstanding faculty, graduate students, and post-doctoral fellows. Four existing facilities were identified including 1) Genomic Sciences Laboratory (GSL), 2) Cellular, Molecular Imaging Facility (CMIF), 3)

Nanofabrication Facility (NNF), and 4) Analytical Instrumentation Facility (AIF). An additional chemistry core; Molecular Education, Technology, and Research Innovation Center (METRIC); is in planning. Our office also worked with the Office of Information Technology (OIT) to develop a cloud-based laboratory management software package, Mendix, so all university core research facilities can be linked and operated by a single software suite.

Research Leadership Academy Launched

The Research Leadership Academy was established in FY2016 to promote a culture of leadership in research/scholarship and research mentoring at NC State. ORIED collaborated with the inaugural class to identify 2017-2018 priorities, which include a lunch and learn seminar series, faculty research forum, and a program for mentoring and nominating faculty for national and international awards.

Federal Relations

Federal Relations focused its efforts on diversifying funding agencies. The office worked to develop and advise faculty that are capable and interested in pursuing DOD research. In support of that effort, we hosted Dev. Palmer (DARPA Program Director) and had more than 100 attendees for his talk about working with DARPA. Federal Affairs also helped connect faculty with program managers at ARO, ONR, and DARPA, which led to meetings with more than 100 faculty members interested in pursuing defense research opportunities. As a result of this effort, 20 white papers were written and 8 faculty members were selected for reverse site visits to Washington, DC for further discussion.

Chancellor's Innovation Fund (CIF)

Approaching its 7th year, the Chancellor's Innovation Fund has awarded \$2.3M to 35 projects thus far, resulting in

- 12 startup companies launched
- 17 license and option agreements
- \$12M in follow-on funding to support further development (SBIRs, SPAs, with industry, etc.)

- \$1.1M in licensing revenue

3. Enhance Interdisciplinary Scholarship to Address the Grand Challenges of Society

Game-Changing Research Incentive Program

ORIED partnered with RTI International (RTI) and the Kenan Institute for Engineering, Technology and Science (KIETS), to fund the Game-Changing Research Incentive (GRIP) program. The program aims to stimulate interdisciplinary research at NC State and with collaborators across the triangle. Funded projects will produce visionary solutions to real-world problems. Fifty-nine proposals were submitted, representing 300+ NC State faculty. Together, ORIED, RTI, and KIETS provided \$2.5M in funding 4 projects over 3 years and a smaller project over 2 years. The funded proposals include projects to 1) find innovative solutions for water sustainability, 2) provide precollege students with foundational knowledge and skills in computational thinking, 3) develop 3D printed biocompatible materials, cells, and supporting components, and 4) identify genetic variants that predispose people to disease and can predict patients outcomes to treatments.

Manufacturing USA, National Network of Public-Private Institutes

NC State became a lead partner in the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL) coordinated by the University of Delaware and supported with a five-year, \$70M grant from the U.S. Department of Commerce. Dr. Ruben Carbonell serves as the chief technology officer for NIIMBL. There are currently 14 public-private manufacturing institutes in the network. NC State is directly involved in seven of the 14 institutes — the most of any university in the country.

4. Enhance Organizational Excellence by Creating a Culture of Constant Improvement

Research Mentoring and Development

The Proposal Development Unit (PDU) hosted 12 research development workshops and events designed to increase the competitiveness of NC State proposals submitted by our faculty and staff. Over 360 faculty members attended these events which included “teaming” webinars for

large-scale proposals, DoD MURI Panel, Cybersecurity Panel, NIH Grant Writing Workshop, NSF CAREER workshop, etc. The PDU also meets bi-monthly with 40+ college representatives through the Proposal Development Network to foster collaboration on proposals involving multiple Departments and/or Colleges.

Entrepreneurship Educational Events

The Office of Technology Commercialization and New Ventures (OTCNV) hosted a Lunch and Learn focused on Tangible Property Licensing & Material Transfer Agreements in collaboration with KeraFast, a company that specializes in licensing tangible property such as antibodies. In addition, OTCNV hosted a spring Startup Bootcamp. This all-day event involved a number of our ecosystem partners and culminated in a networking reception. Topics covered included: the Basics of Commercialization and Entrepreneurship, Phases of the Venture Development Process, Founding a Company, Intellectual Property, and Incubation and Support Resources. The event was attended by 15 faculty members and was incredibly well received.

Research Administration Education

Sponsored Programs and Regulatory Compliance Services (SPARCS) and Finance and Administration's Contracts and Grants (C&G) created an Education and Communications Unit to jointly train and communicate vital research administration updates to staff across campus. In its first year, the unit created 3 eLearning courses with another 15 in development and provided 5 new or revised instructor led courses 16 times throughout the year, reaching over 370 learners.

Identification of New Electronic Research Administration (eRA) System

NC State formally launched a project to select and implement a new state-of-the-art electronic research administration (eRA) system. Significant drivers in the decision to replace existing systems were the growth of our research enterprise, increased functionality for faculty and staff, and increased emphasis on compliance. A cross-campus steering team consisting of faculty and staff was convened to oversee the collection of stakeholder needs, develop and release a Request for Proposal (RFP), and advise data stewards in the selection of a new system. The

steering team held numerous focus groups with 250+ participants representing all 10 colleges and various roles within the university. The RFP was released in April 2017 and the top 3 vendors were identified in July 2017. Successful implementation of the new eRA system will be one of the most significant research administration initiatives for NC State in the next several years. Replacing current in-house systems with a vendor based system will require significant alignment across the campus on research processes and will be both a logistical challenge and cultural change.

5. Enhance Local and Global Engagement through Focused Strategic Partnerships

Wolfpack Investors Network Launched

The Wolfpack Investor Network (WIN), a collaboration between ORIED, KIETS, the Poole College of Management and the Entrepreneurship Initiative, was launched in the Fall of 2016 to connect alumni investors with promising NC State-affiliated startup companies to facilitate angel investments. WIN nearly doubled its year 1 membership goal by recruiting 68 members. Over \$900K has been invested in 5 startup companies to date, with \$100K of this investment coming from NC State's Seed Capital Endowment Fund.

Ecosystem Partner Grant

NC State, Duke, and UNC were awarded a \$250K Ecosystem Partner Grant from the NC Idea Fund to connect the three universities' angel networks as the Triangle Venture Alliance (TVA). One NC State startup, 410 Medical, has already received funding from TVA to develop innovative products that enable front-line medical providers to improve the care for critically ill patients.

Smart Cities Initiative

The Office of Partnerships and Economic Development (OPED) facilitated the signing of a Memorandum of Understanding (MOU) between NC State and the City of Raleigh to collaborate on smart city initiatives. To kick-off the initiative NC State hosted the 1st Triangle Smart Cities Summit on June 6, 2017 where the MetroLab Network announced the City of Raleigh in

conjunction with NC State were granted a MetroLab membership. The event brought together 350+ local city, industry, and academic leaders to share ideas aimed at making our region a smarter and more connected community.

Sponsored Programs Master Agreements

Recognizing the important role master agreements play in facilitating research and service projects with strategic partners, Sponsored Programs established:

- Dow AgroSciences Master Technology Evaluation Agreement
- Zoetis Master Research Agreement
- British American Tobacco Master Research Agreement
- Aseptia, Inc. Master Research Agreement
- OneHealth Company Master Veterinarian Clinical Trial Agreement
- R.J. Reynolds Master Research Agreement (renewal)
- Dairy Management Inc. Master Research Agreement (renewal)

Economic Development Projects

The Office of Partnership and Economic Development (OPED) worked on 60 new and expanding industry projects throughout North Carolina. This year brought the opportunity to assist North Carolina in landing significant investment. A few of the highlights are shown in the table below.

Economic Development Projects – FY2017

Company	Description	Location	Capital Investment
Infosys (India)	2,000-job technology and innovation center	Wake County	\$8.7M
Everest Textiles USA (Taiwan)	610-job manufacturing facility	Rutherford County	\$18.5M
MAS Holdings (Sri Lanka)	133-job acquisition-expansion-retention	Randolph County	\$20M
Credit Suisse (Switzerland)	1200-job expansion	Wake County, RTP	\$70.5M
CSX Connector	500-job acquisition	Edgecombe County	\$300M

Appedix: ADDITIONAL ACCOMPLISHMENTS

Volume of Activities

Volume of Activities – FY2017

Activity	2016	2017	% Change from previous year
*Total Sponsored Awards	\$348,603,425	\$405,408,054	16.29%
Number of Sponsored Research Projects	2,855	2,830	-0.88%
Dollars Requested for Funding	\$1,032,546,483	\$1,312,902,945	27.15%
Number of Proposals Submitted	3,389	3,424	1.03%
PDU-Assisted Proposals: Dollars requested	\$424,746,522	\$325,077,014	-23.47%
*Number of PDU-Assisted Proposals Submitted	34	44	29.41%
Number Limited Submissions	9	11	22.22%
Number of Centennial Campus (CC) Partner Prospects	50	62	24.00%
Number of Centennial Campus (CC) New Partners	17	13	-23.53%
Number of Students Hired by CC Partners	320	300	-6.25%
Number of Invention Disclosures	290	275	-5.16%
*Number of Commercialization Licenses & Options Agreements	160	169	5.63%
*Number of Startup Companies Launched	12	15	25.00%
*Indicates a record year			

Special Achievements

NC State Research and Innovation Rankings

This year, NC State ranked #7 in total R&D expenditures among public universities without medical schools and #3 in Industry research expenditures among public universities without medical schools (HERD survey, 2015). NC State ranked #2 among all US universities without medical schools for licenses and options executed. The [Milken Institute](#) recognized NC State as a top 25 University in a 4 year retrospective assessment of 4 key tech transfer metrics; we were ranked #10 for licensing in this report. In addition, NC State jumped from 97th to 80th in terms of patent issuances, according to a new report from the [National Academy of Inventors](#).

Staff: Major New Appointments, Kudos, Professional Activities and Recognition

- Leah Burton was appointed to the Board of Directors and the Executive Committee of the [Association of University Research Parks](#).
- Dennis Kekas was appointed to the Board of Directors for the [Clemson University Research Foundation](#).
- Dennis Kekas received the [“Leadership Award”](#) from the Association of University Research Parks. The annual award was given in recognition of his outstanding contribution to the success and total community impact of Centennial Campus.
- Paul Enriquez, Licensing Intern, authored the first legal publication on the CRISPR patent landscape.
- Amy Parker, New Ventures Program Support Specialist, was a recipient of the University Award for Excellence and will move on to the statewide competition.
- Kelly Sexton, Ph.D., was promoted to Assistant Vice Chancellor of Technology Commercialization and New Ventures.