College of Agriculture and Life Sciences

Annual report to the Chancellor 2014-2015
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2014-2015

College of Agriculture and Life Sciences

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The College of Agriculture and Life Sciences (CALS) excelled in myriad areas during the 2014-2015 fiscal year. This report allowed us to reflect on the accomplishments of our students, staff, faculty and administrators.

**Strategic Plan**

1. **Enhance the success of our students through educational innovation.**

   **Leadership:** The fiscal year began with a $2 million gift from Gail and Joe Dunn. This gift allowed CALS to create the annual Adolph Warren Leadership Program for selected sophomores, juniors and seniors who have demonstrated interest in and potential for future leadership in agriculture and public service.

   **Student Access:** Just a few months after making a $3 million gift to the College of Agriculture and Life Sciences to seed an innovative rural student access initiative, Joe and Debbie Gordon hosted students from the STEAM program. The program is an alternative admissions pathway for NC students interested in pursuing an agricultural major in the college. STEAM is one part of a larger program, “Farm to Philanthropy” funded by the Gordon’s endowment. Another initiative is A.S.P.I.R.E, which helps rural students prepare for standardized college entrance exams by providing intensive test preparation courses through the Cooperative Extension centers in their home counties.

   **Study Abroad:** NC State was one of nine universities from throughout the U.S., Canada and Latin America to win a “100,000 Strong in the Americas” innovation grant to boost the number of Western hemisphere students studying abroad. The initiative is aimed at enhancing hemispheric competitiveness, increasing prosperity and better preparing a globally aware workforce. Through collaboration between NC State’s Study Abroad Office and Department of Crop Science, the university is building on its successful partnership with the Universidad de Costa Rica to launch a new course model and short-term study abroad program for agricultural disciplines that are underrepresented in study abroad.
Curriculum reform: The Departments of Horticultural Science and Crop Science have received permission from the Provost with recommendation from the Council of Deans to plan a new B.S. degree (Agroecology and Sustainable Food Systems). This will be the first-degree program in the college that is cross-listed between two departments that will share the advising of students enrolled in the degree.

Undergraduate Research: During a recent alumni survey, nearly 40% of CALS students participated in undergraduate research. Many received college credit for their research activities through off-campus learning experiences, departmental Special Topics, and the CALS Honors Program. Greater than 77% indicated that their research experience assisted them in their career goals or post-graduate studies. Additionally, more than 40% of CALS undergraduates participated in a structured internship. When asked how technically competent their program prepared them, approximately 85% indicated that they had received excellent or good preparation.

Honors Program: The CALS Honors program has undergone a significant transformation that will better serve high achieving students from recruitment through graduation. Specifically, we've moved away from a three-year research program and expanded to a four-year program with options to go deep into coursework, to participate in undergraduate research, or to study abroad. These programmatic changes will allow us to serve a much larger community of students and will, through coursework and extracurricular activities, require them to both 'think and do'.

Amplify My Potential (AMP): AMP is a new student program designed to provide development opportunities for Ag Institute (AGI) first-year students to help them recognize their potential and create a positive change within themselves, the school community, and the world. The program will allow students to build relationships with each other and the faculty and staff at NC State as well as begin to build a professional network. The program is semester long and kicks-off each semester with a weekend retreat filled with workshops.
and fun events! Some of the workshops include topics such as identifying personal strengths, finding motivation, and teamwork. Students also complete a community service project, participate in the AGI Club and serve as an Ambassador for the AGI within the university. Upon the completion of the AMP program students receive a certificate that looks great on resumes. This is also a great way for students to meet industry representatives and help lead them into a career.

**New Graduate Student Opportunities:** Established summer internship programs for graduate students at local industry partners, including Bayer CropScience, BASF, Monsanto, and AgBiome. Established graduate student fellowships with industry partners Bayer CropScience and Syngenta. Graduate students participated in international exchange program with the University of Costa Rica through the Tropical Plant Pathology course.

**Student Diversity:** Recently, the Top 100 Degree Producers Rankings for 2014 were released by Diverse Issues In Higher Education. NC State is now ranked 9th in the nation for graduating minority students in agriculture, agriculture operations, and related sciences at the baccalaureate level. Minority students, for this ranking, include African-American, Hispanic/Latino American, and Native American. This is something to celebrate because just five years ago NC State was ranked number 21st in the nation for graduating undergraduate minority students in agriculture, agriculture operations, and related science.

**Graduate Student Diversity Programs:** This past academic year, CALS continued to implement the Dean’s Graduate Research Assistantship (DGRA) program that provides competitive stipends to graduate students from underrepresented minority groups. This is a 1 to 1 matching partnership with departments to fully fund Master’s students for two years and Doctoral students for at least four years. Beyond receiving the assistantship, the DGRA students have to pay it forward by assisting with mentoring undergraduate students, coordinating professional development workshops for other graduate and undergraduate students, etc.
2. Enhance scholarship and research by investing in faculty and infrastructure

**Plant for Human Health Allergy Work:** A team of scientists from NC State’s Plants for Human Health Institute developed a food ingredient from peanut flour and cranberry extracts, among other plants, that has the potential to reduce the life-threatening allergic reactions brought on by peanut consumption. Such a product might one day help people with allergies to develop a tolerance for peanuts. Food scientist Dr. Mary Ann Lila was a lead author of the research, published in the *Journal of Agricultural and Food Chemistry*.

**Plant for Human Health Walnut Research:** Researchers with NC State University’s Plants for Human Health Institute developed a unique methodology for exploring walnut phytochemicals – the health-conveying compounds, like antioxidants, that occur naturally in plants. This new research approach is expected to create research opportunities that will lead to a greater understanding of the walnut’s impact on human health. Led by Dr. Mary Grace, the research was published in the journal *Food Chemistry*.

**Healthy Choices for Kids:** Getting children to eat fruits and vegetables is no small feat. Drs. Suzie Goodell and Virginia Carraway-Stage are out to change that. They developed an innovative pictorial method to assess preschoolers’ liking of familiar fruits and vegetables. Their goal, according to Goodell, assistant professor of Food, Bioprocessing and Nutrition science, was to develop a better tool for researchers to use with nutrition education programs designed to improve children’s fruit and vegetable intake. The project, Carraway-Stage’s doctoral dissertation as Goodell’s student, was featured in the journal *Appetite* and has garnered international attention.

**Human Disease-Causing Pathogens:** NC State researchers mapped for the first time human disease-causing pathogens, dividing the world into a number of regions where similar diseases occur. Their findings, published in the journal *Ecosphere*, show that the world can be separated into seven regions for vectored human diseases – diseases that are spread by pests, like mosquito-borne malaria – and five regions for non-vectored diseases,
like cholera. Michael Just, an NC State Ph.D. student in plant and microbial biology, was lead author.

**Yield Improvement:** Increasingly harsh drought conditions in the U.S. Midwest’s Corn Belt may take a serious toll on corn and soybean yields over the next half-century, according to research published in the journal *Science*. Corn yields could drop by 15 to 30 percent, according to the paper’s estimates; soybean yield losses would be less severe. Dr. Roderick Rejesus, associate professor of agricultural and resource economics, was co-author.

**Wasp Management:** In the journal *Biology Letters*, Ph.D. student Emily Meineke, biological sciences professor Dr. Rob Dunn and Dr. Steve Frank, associate professor of entomology, showed that some insect pests are thriving in warm, urban environments and developing earlier, limiting the impact of parasitoid wasps that normally help keep those pest populations in check. These urban changes give scientists a better idea of how climate change will disrupt ecosystems by changing insects’ life cycles.

**Recognition:** The JC Raulston Arboretum ranked 8th in nation as one of the "50 Most Stunning University Gardens and Arboretums" by the website Best Masters Programs.

**Beef Cattle Research:** Continued implementation of the beef cattle research model to optimally provide research animals to beef cattle and forage research programs.

**Land Development:** The Lake Wheeler Road Master Plan was submitted to the University Space Committee, which assigned 358 acres of woodland to CALS. A woodland management MOU was developed between CALS and NCDA&CS for forest tracts on NC State research stations and field labs, aimed to manage forestlands sustainably and as a source of future revenue to NC Ag Research Service. CALS broke ground on the SECU 4-H Learning Center & Cole Foundation Auditorium at Millstone 4-H Camp.

**Research Station Upgrades:** We completed equipment upgrades on research stations in the second year of a two-year special appropriation of $5 million to both NC State
and NCDA&CS stations. Nearly $6 million dollars in equipment was purchased as the appropriation was leveraged with trade-ins to maximize purchasing power.

**Faculty Investments:** Dr. Terrence Gardner, the first Dean’s Postdoctoral Fellow who was mentored by Dr. Owen Duckworth, was hired as faculty in the Soil Science Department in August 2014. He was the first African-American male tenure-track faculty hired in nearly two decades. The second Dean’s Post-doctoral Fellow, Dr. Warren Sconiers began in the Fall of 2014 under the mentorship of Dr. Steven Frank in Entomology. CALS is also making significant strides in increasing female faculty in the College.

**New Extension Area Specialist:** We are adding 15 new Area Specialized Agent (ASA) positions as a result of our strategic plan. ASA positions serve as a hybrid between an Extension specialist and a county agent. New ASAs will be provided for greenhouse and nursery crops, fruits and vegetables, forestry, grains, dairy, aquaculture, and both commercial and consumer food safety. We posted each of the first nine positions by the end of June 2015.

**Extension Teams:** A committee is defining how to structure new Extension program teams. These teams will be composed of agents and specialists, and may include researchers and stakeholders. The three initial program teams have been identified as Animal Systems, Local Foods and a Family and Consumer Sciences-related team (final focus TBD). The ultimate goal is to have nearly all Extension programs planned, funded, delivered and evaluated through integrated program teams.

3. **Enhance interdisciplinary scholarship to address the grand challenges of society.**

**Crop Improvement for Sub-Saharan Africa:** NC State University will receive $12.4 million over the next four years from the Bill & Melinda Gates Foundation to improve a crop that is an important food staple in Sub-Saharan Africa – the sweet potato. The grant will fund work to develop modern genomic, genetic and bioinformatics tools to improve the
crop’s ability to resist diseases and insects and tolerate drought and heat. Sweet potatoes are an important food security and cash crop with potential to alleviate hunger, vitamin A deficiency and poverty in Sub-Saharan Africa. The interdisciplinary project, directed by Dr. Craig Yencho, will involve NC State, the International Potato Center, Michigan State University, Cornell University, the University of Queensland, Uganda’s National Crops Resources Research Institute and Ghana’s Council for Scientific and Industrial Research.

**AgBiotech Collaboration:** With the world population projected to reach 9.5 billion by 2050, creating the need to produce more food than we have in the previous 10,000 years, the College of Agriculture and Life Sciences partnered with the state’s Biotechnology Center to host a two-day think tank on the future of food production. Nearly 500 people from industry, government and academia – including internationally renowned experts – took part in the North Carolina Agriculture and Biotechnology Summit’s intensive discussions on technology and choice, GMOs and food safety, waste and want, the power of plants and innovation in agriculture.

**Strategizing to Mitigate Plant Disease:** Dr. Jean Ristaino, of the Department of Plant Pathology, was principal investigator and Dr. Linda Hanley-Bowdoin, of the Department of Molecular and Structural Biochemistry, was co-principal investigator for the Emerging Infectious Plant Diseases of Africa in the Context of Ecosystem Services conference held at the Rockefeller Foundation Bellagio Conference Center in Bellagio, Italy. Conference participants from varied disciplines worked together to develop a strategy to mitigate impacts of emerging plant diseases in Sub-Saharan Africa.

**Sustainable Energy:** NC State University and plant and microbial biology associate professor Dr. Heike Sederoff were featured as “green giants” – leaders in academic programs focused on sustainable energy – by Winds of Change, the journal of the American Indian Society for Engineering and Science. Sederoff directs an interdisciplinary project that focuses on converting camelina into biofuels. The team includes biologists, engineers and
economists who work together on all aspects of camelina improvement, from agricultural management to genetic engineering to fuel conversion.

**Research Partnership Development:** The NC Agriculture Research Service Director of Partnership Development assisted Center for Integrated Fungal Research to apply for a membership-supported consortium at NC State. The effort has two verbal commitments to membership and the Director is pursuing others. The Letter of Intent to submit an I/UCRC Planning Grant was accepted by NSF. The Director of Partnership Development has a role in relationship management, including expanding existing relationships and developing new ones. Expanding relationships has involved 14 prospects (BASF, Bayer CropScience, Dow AgroScience, DuPont/Pioneer, Monsanto, Syngenta among others), and the Director has worked to develop new relationships with 24 prospects.

**Grant Development:** The CALS Grant Proposal Developer contributed to the submission of 23 proposals and developed, initiated and manages the Dean’s “The Big Ideas Grant Program,” which has received 4 applications, funded 3, one of which resulted in the team submitting a $4 million AFRI grant. The college also managed and executed the Dean’s Enrichment Grant Program, including collaborations with CNR, CVM, stakeholder and VA Tech joint enrichment grant programs.

4. **Enhance organizational excellence by creating a culture of constant improvement.**

**Extension Strategic Planning:** After celebrating NC Cooperative Extension Service’s 100th anniversary, beginning in August NCCES began to lay the groundwork for success in its second century of extending research-based knowledge to North Carolinians, Cooperative Extension at NC State embarked on a new strategic plan focused on agriculture, food and youth.

**Fundraising’s Record-Setting Year:** The College of Agriculture and Life Sciences’ fundraising soared to a record $34.4 million in FY 2014 and is on another record-setting
pace this year, spearheaded by major gifts to: the William K. Collins Tobacco Agronomist Initiative by RJ Reynolds, Universal Corporation/Universal Leaf Tobacco Company, Altria Client Services, Philip Morris International Management LLC, and more than 150 other companies and individuals contributing over $7 million to date; the Plant Sciences Initiative led by the NC Small Grain Growers Association, NC Soybean Producers Association, Corn Growers Association of North Carolina, NC SweetPotato Commission, NC Pork Council and NC Peanut Growers Association, with $8.5 million in conditional pledges thus far; the Adolph Warren Family Leadership Program funded by Mr. Warren’s daughter Gail W. Dunn and her husband Joe Dunn, with gifts and pledges of more than $2 million to support student leaders through scholarships and public policy/service internships; the M.B. "Dutch" Gardner Poultry Science Scholarship Endowment, supported by Dutch’s daughter Nancy G. Smith with planned gifts in excess of $1.2 million; the Dr. George J. Kriz and Mrs. Rhoda W. Kriz endowments (at least six) funding faculty travel and supplements and four distinguished professorships through estate gifts of $4.5 million; the E. Carroll Joyner Beef Education Program and Endowment and the E. Carroll Joyner Beef Education Unit and Endowment, with gifts of $5 million from Mr. E. Carroll Joyner; and the Gordon Family Farm-to-Philanthropy Program Endowment, a new initiative supporting student access and success in CALS, made possible by a $3 million commitment from Dr. Joseph K. Gordon and Mrs. Deborah K. Gordon.

**College Diversity Programming:** Increasing diversity is critically important; however, making the organizational climate inclusive so that diversity thrives is also essential. The college’s Office of Diversity Affairs offers a multi-level professional development portfolio of offerings to build diversity awareness and cultural competence. In 2014, Dr. Jones implemented the Food for Thought Lunch and Learn sessions, which are monthly one-hour facilitated conversations that focus on different dimensions of diversity and explore strategies to make CALS more inclusive. Consistently, 70 to 80% of participants
rate the sessions as 5 out of 5 with 5 being the highest. Nearly 40 faculty and staff have
participated to date. In partnership with the Office of Institutional Equity and Diversity, the
College offered a Building Bridges workshop this year exclusively for CALS faculty and staff
including those in county extension. This is a one-day workshop on campus that builds
cultural competencies as well as teaches advocacy skills and provides tools for addressing
inappropriate behaviors or comments. For eight years, the College has sponsored the more
in-depth Opening Doors workshop reaching over 250 faculty and staff. The three-day
workshop, which is held at a remote retreat center several hours from campus, uses open
discussions and interactive exercises to teach a framework for increasing diversity
awareness and enhancing a person’s ability to create an inclusive organization.
Consistently, evaluation feedback indicates that Opening Doors is very effective. For
example, for the most recent workshop, the mean scores for all Opening Doors evaluation
question items ranged from 4.3 to 4.7 out of 5. These different training formats and
durations meet faculty and staff where they are and provide room for them to explore
diversity on many different levels.

5. **Enhance local and global engagement through focused strategic partnerships.**

- **Local and Sustainable Agriculture:** The Center for Environmental Farming
  Systems (CEFS) integrates research, Extension and education to support sustainable
  agriculture and the development of a N.C. local food economy. In 2014, over 2,000 people
  attended CEFS events and workshops statewide. NC Choices helped grow N.C.’s meats
  market; meat handler registrations issued by the N.C. Dept. of Agriculture & Consumer
  Services increased from 1 in 2002 to 544 in 2013. The NC 10% Campaign has engaged
  nearly 7,500 people and 1,000 businesses, tracking $64 million in local foods spending
  since July 2010.

- **CEFS Incubator Success:** Firsthand Foods, Inc., a company incubated by NC
  State’s Center for Environmental Farming Systems procures and distributes locally
produced beef and pork to retail and food service users as well as consumers. In 2014, the company produced sales of $1.25 million, with 75% of the revenue being remitted to the producers.

**Food and Nutrition Education Program:** The Expanded Food and Nutrition Program (EFNEP) serves limited-resource families with young children, school-age youth and pregnant teens. There are 27,230 people participating in EFNEP who are served throughout 51 NC counties, and roughly 9 out of 10 participating parents improved in one or more nutrition, food safety and food resource management practices.

**Steps to Health:** The Supplemental Nutrition Assistance Program-Education (SNAP-Ed) serves limited resource individuals and families nationwide. NC State’s SNAP-Ed project is Steps to Health. There are 6,193 participants (5,376 children and 817 adults) reached through six distinct outreach programs to help participants from pre-K to older adults make healthy choices within a limited budget and we have made 46,520 educational contacts made within 56 counties.

**Eastern NC Food Processing:** Carolina Innovative Food Ingredients Inc. broke ground on a $20 million Eastern North Carolina sweet potato processing facility that will use an innovative procedure developed by Dr. Michael Boyette, a faculty member in the Department of Biological and Agricultural Engineering. The company will process sweet potatoes that are sound and wholesome but have undesirable shapes, sizes or surface blemishes, turning them into value-added, high-quality, food-grade dehydrated and juiced ingredients for human and pet consumption.

**High School Biotech Start-up:** Dr. Matt Koci of the Prestage Department of Poultry Science has teamed with Bertie Early College High School (BECHS) science teacher Bruce Boller to develop a model biotech company that will be run by the school’s students. The company will produce research-quality recombinant proteins – proteins made from a foreign gene and introduced into bacteria using biotechnology – to support active agricultural
research projects at NC State and other North Carolina universities. In July 2014, BECHS students participated in a weeklong intensive biotech boot camp at NC State, which included everything from hands-on lab training to visits with biotech companies in the Research Triangle Park. Another boot camp is planned for summer 2015.

**Food and Ag Research:** Dr. Nancy Creamer, horticultural science professor and director of the Center for Environmental Farming Systems, was named to a 15-member board of directors for the new national Foundation for Food and Agricultural Research (FFAR). The foundation leverages public and private resources to increase the scientific and technological research, innovation and partnerships critical to boosting America’s agricultural economy. (July)

**Plant ID Course:** A collaborative effort between Longwood Gardens and faculty in the Department of Horticultural Science has developed an online plant identification course. This first of its kind course is rich with high quality images and gamification modules where students earn badges and compete for top placement on a leader board.

**Collaborative Projects:** Projects include research in 14 departments in CALS and research collaborations at NC State with CNR, COS, COE, CHASS, CVM and the School of Agriculture and Environmental Sciences at NC A&T. Additionally, NC Research Campus at Kannapolis has projects involving NC State, UNC-CH, UNC-G, UNC-C, NCCU, NC A&T, ASU and Duke University. The college also has research and extension Centers at Plymouth and Mills River.

**Commodity Groups:** Our extensive partnerships with agriculture, business, education, government and industry create a unique culture of collaboration that increases productivity and fuels economic development. There are more than 80 active commodity organizations; state and federal agriculture and life sciences agencies; agricultural advocacy organizations such as NC Farm Bureau, NC State Grange, NC Biotechnology Center, variety of agricultural and life sciences companies.
NC State and NC A&T’s 4-H Program: 4-H is the largest youth organization in North Carolina, empowering hundreds of thousands of young people across the state. With more than 20,563 youth and adult volunteers working to enrich the lives of more than 12,000 young people through its NC three camps, and 139,333 youth in the 4-H in-school K-12 outreach programs.

Extension Master Gardener (EMG): Extension Master Gardener trains thousands of volunteers who work with Extension agents to deliver research-based information on sustainable gardening and landscaping. More than 4,000 volunteers contributed services in all 100 counties and the Eastern Band of Cherokee. In 2014-2015 these volunteers spent 18,690 hours managing demonstration gardens, 7,352 directing youth programs and 5,301 presenting educational talks (more than 186,000 total hours). Total, these essential volunteers donated $5.4 million in time, services and in-kind contributions to Extension.

Additional Topics

A. Changes in Service Environment

Changes in CALS

The Department of 4-H Youth Development and Family and Consumer Sciences has a new name: the Department of Youth, Family, and Community Sciences.

The Bobby G. Wilder Visitor Center and the Legacy Brick Circle Entrance was dedicated at NC State’s JC Raulston Arboretum. Bobby Wilder, a longtime benefactor of the JCRA, was honored for his many hours of volunteer service, years of financial commitment and generous planned gifts.

Extension Conversions

NC Cooperative Extension Service (NCCES) has begun implementing their strategic staffing plan, which initially recommended eliminating state funding on 77 administrative support positions. At this time, an internal transfer process and county partner support have
helped reduce that number to roughly 20-25, or approximately 75 percent fewer than was anticipated.

NCCES invested in Compass, NC State’s online professional development program, to help our administrative support personnel with the transition process for a full calendar year. Using the most recent available data, 137 of our 185 county support staff have registered (3 out of 4), with participants completing more than 250 courses.

The starting salaries of our agents increased from $33,500 to $34,500, a key objective of our strategic plan, which will help us recruit and retain the best talent.

Extension is transitioning to a sub-brand of NC State. Having received final approval from university leadership, the N.C. Cooperative Extension Service will become “NC State Extension,” tentatively slated for launch in late 2015. Extension is collaborating with N.C. A&T, local governments, and college and university leadership to develop and implement the new brand. The result will be a revamped communications platform, and guidelines to help everyone support it, which will better reflect our university, increase awareness statewide and position Extension for long-term success.

The 4-H camps have experienced significant budget challenges for over a decade. A concerted effort was made in 2014, working with the Dean of the College of Agriculture and Life Sciences, chief financial officer at NC State and others, to close four of the six camps that were deeply in debt. The group also sought buyers for two of the camps to pay off the debt to the university. Legislative response to this action was negative due to citizen complaints, and statutes were implemented that required us to keep three camps open and give one away with no financial compensation. Legislation on the two remaining camps do permit us to sell them in the future and keep the funds for 4-H programs, but it prohibits us from using any proceeds to pay off the camp debt to the university. Financial plans have been updated to resolve the debt.

B. Initiatives
CALS focused on five primary initiatives last fiscal year: Plant Sciences, Food Manufacturing and Processing, Student Access, Leadership, and Food Animal. These areas will continue to morph and gain substance in SFY15-16.

Feasibility and economic impact studies, supported by state appropriation, were completed for the Plant Sciences Initiative and NC Food Processing and Manufacturing Initiative.

C. Diversity

Nearly all of the college’s diversity programs feed directly into the university and the college’s strategic plan. Please see section one and four for specific programs.

D. Instructional Program Advances

DELTA: Lee Ivy, a Lecturer in the Department of Horticultural Science received a DELTA IDEA grant to develop a media rich Home Horticulture course that also has gamification features. Plant Pathology received DELTA IDEA grant to develop online labs for undergraduate Plant Pathology courses integrating new interactive technology into diagnosis and experimental design modules.

New Minor: CALS established a new minor in Applied Ecology.

Program Reviews: Agriculture and Resource Economics completed a comprehensive Undergraduate Program Review on both the 4-year degree program and the 2-year program. Plant and Microbial Biology underwent its academic program review this year. As a result of the recommendations made by the review team, we have made revisions to the B.S. in Plant Biology degree requirements that give students more flexible course options. These revisions have the potential to attract more students to the Plant Biology major. The Physiology Program underwent its program review in 2014-15. The assessment was very positive and reflects the dramatic growth of the program. Youth, Family, and Community Sciences’ Family Life and Youth Development Program awarded the CFLE-approved program designation, which required a rigorous curriculum review.
**New Courses:** The Entomology department taught course PP241, ‘The Worm’s Tale,’ for the first time as a new GEP Interdisciplinary Perspectives course (42 students enrolled; overall course evaluation 4.7/5). Plant Pathology received approval for a new course in Plant Disease Resistance: PP 755 – Plant Disease Resistance-Mechanisms and Applications.

**New Programs:** (1) National Science Foundation sponsored Research Experience for Undergraduates Program--Basic and Environmental Soil Science Training (BESST). Eleven undergraduates from across the U.S. and France are spending the summer here. (2) YFCS Faculty received funding to conduct scholarly research on Family Science professionals’ use of social media skills as a key value of potential employers. Used data from this research to develop assessment criteria for use in FYD courses.

**E. Research**

**Major grants:** Yencho $12 million Gates Foundation award; Lommel and Opperman (PI) proposal invited for stage 2, $1 million Gates Foundation grant; McClelland $1.7 million SNAP-ED program in YFCS; Washburn $1.4 million USDA project related to organic mastitis treatments; Louws SCRI $2.9 million supplement to multi-state project to develop and deploy grafting technologies for fruits and vegetables; negotiated $950,000 3-year gift from Murphy-Brown LLC to support programs in swine manure value recovery, enhancing commercial bacon production and increasing feed grain production in the mid-Atlantic states.

**New Professorship:** Bayer CropScience for Soybean Breeding professorship is at the top of NC State’s Distinguished Professors Trust Fund queue; anticipate receiving matching funds during 2015-16.

**Sweet Potato Research:** Initiated first year of collaborative and integrated research effort to solve the sweet potato internal necrosis problem.

**CALS’ Successful Dairy Mobile Application:** Dairy Record Management Systems, originally developed in the college, created a mobile app for dairy farmers that combine herd...
reproductive and health data with complete data entry capability for the herd. The product, “VetCheck Maxx” received a “Top 10 New Products” award at the 2015 World Ag Expo.

**SFY 2014-2015 Research Summary**

**People**

- 296 research scientists (177 FTE); 291 graduate assistants (123 FTE)
- 99 post docs (84 FTE); 205 technicians and support staff (183 FTE)
- 167 researchers (146 FTE research assistants, associates and researchers)

**Programs**

- 58 IP disclosures (26 inventions; 18 plant varieties; 9 copyrights; 5 software)
- 49 patents filed; 14 patents issued
- 702 peer reviewed research publications
- Increased grants awarded over 12% to $75.9 million (6/1/2014-5/31/2015)

**F. Extension**

**Recognition:** North Carolina Cooperative Extension’s facilitation program received a national award from the Joint Council on Extension Professionals recognizing its efforts to help groups and counties across the state collaborate and plan for and implement change.

Allocated startup funds to new hires. Recent new hires have acquired significant competitive funding, e.g., Sozzani awarded 5-year NSF Career Award for $750,000 plus a second international NSF award co-funded by Biotechnology and Biological Sciences Research Council; Layman 3 NSF awards for $750,000.

**SFY 2014-2015 Extension Summary**

- 6.3 million direct contacts with people across the state
- NC State provides 931 total Extension employees (602 in the counties and 329 on campus)
• Extension is NC State’s largest outreach function and the largest non-formal educational outreach organization in the 17-campus UNC system

• $182 Million: Economic impact our people and programs generated in 2014 – about $4 returned on every $1 invested.

• $2 million – Net income growth from sales of locally-produced agricultural products to local buyers

• 36,897 – People increasing their fruit and vegetable consumption

• 78,193 volunteers donated 707,264 hours of service, engaging nearly 2 million educational contacts statewide

• $2.2 million – Value of local businesses started or retained for which Extension was instrumental in the business establishment or retention

G. Faculty: Honors, Awards, Recognitions

Dr. Robert Evans, retired head of the Department of Biological and Agricultural Engineering, was named to the International Drainage Hall of Fame. Evans was cited for internationally recognized contributions to drainage, drainage water management, stream and wetland restoration, riparian buffers and nonpoint source pollution control.

Dr. Jose Alonso, professor in plant and microbial biology, was listed by Thomas Reuters Corp. as one of The World's Most Influential Scientific Minds. Released less than once a decade, Reuters’ list is based on the number of citations a scientist has had in papers published between 2002 and 2012.

A pink buddleia developed by horticultural scientist Dr. Dennis Werner received a 2015 Green Thumb Award from the Direct Gardening Association, the world’s largest nonprofit association of companies selling garden products through catalogs, websites, magazines and more.

Animal scientist Dr. Jack Odle received the New Frontiers in Animal Nutrition Award from the American Feed Industry Association and the Federation of Animal Science
Societies. The award acknowledges pioneering and innovative research relevant to animal nutrition.

Horticultural scientist Dr. John Dole is the 2014 recipient of the Society of American Florists’ Alex Laurie Award. Dole was recognized as a top teacher and sought-after mentor as well as an innovative researcher who has developed new production and post-harvest procedures for a wide range of cut flowers and other floral crops. (August)

Dr. Joe Zublena, associate dean of the College of Agriculture and Life Sciences and director of the North Carolina Cooperative Extension Service, received the Friend of the Counties Award from the North Carolina Association of County Commissioners. He was honored for advancing the interests of the state’s 100 counties and the association.

Lynette Johnston’s publication about the framework for a food safety minor is one of the top 3 downloaded articles in the Journal of Food Science Education.

Wendy Warner trained for and became a Pearson-certified edTPA-ag scorer.

Joy Marshall and her AEE 326 class volunteered hundreds of hours with the Governor Morehead School for the Blind as part of teaching students with special needs about agriculture.

Awards (More than 95 awards received)

Gary Moore, Outstanding Research Award; David Jones, Alumni Distinguished Undergraduate Professor; David Jones, Honorary American FFA Degree; David Jones, NACTA Teaching Scholar Award; Jackie Bruce, NACTA Educator Award; Wendy Warner, Outstanding Teacher Award; John Russ, Outstanding Faculty Adviser Award; Guido van der Hoeven, Outstanding Subject Matter Program Developed by an Individual; Frederick Parker, Outstanding Teacher Award; Melissa Hendrickson, Outstanding Contributions to Undergraduate Education; Ted Simons, Fellow of the American Ornithologists’ Union; W. Cope, William Neal Reynolds Professor; JoAnn Burkholder, Fred A. Harris Fisheries Conservation Award; S. Hale, George H. Blessis Outstanding Undergraduate Advisor;
Wenqiao Yuan, ASABE Superior Paper Award; William Hunt, William Neal Reynolds Professor; Ken Swartzel, Outstanding Alumni Award. Keith Edmisten, Cotton Physiologist of the Year; Michelle Schroeder-Moreno, George J. and Rhoda W. Kriz Faculty Study Leave Endowment Award; Michelle Schroeder-Moreno, Teacher Fellow Award (NACTA); Michelle Schroeder-Moreno, Fulbright Scholar; Ramsey Lewis, University Faculty Scholar; Coby Schal, Alexander Quarles Holladay Medal for Excellence; Hannah Burrack, Special Specialist in Support of County Programs; Hannah Burrack, NC Association of Cooperative Extension Specialists; George Kennedy, Borlaug Award for Service to Society and the Environment; Fred Gould, Entomological Society of America Founders Memorial Award; David Green, Carl R. Fellers Award; Chris Daubert, 2015 Outstanding Engineering Alumnus by The Pennsylvania State University, College of Engineering; Rodolphe Barraangou, Thomas Reuters "Highly Cited Researchers" for 2014; Rodolphe Barraangou, 2014 NC State Alumni Association Outstanding Research Award; Gary Cartwright, 2015 Distinguished Service Award by the ADPA; Pablo Coronel, Industrial Scientist of the Year; Chris Daubert, IFT Fellow; Chris Daubert, Distinguished Alumni Award, The Michigan State University Department of Biosystems and Agricultural Engineering: 2015; Lisa Dean, Acting Research Leader for the Market Quality and Handling Research Unit (MQHRU); April Fogelman, Elected to the Board of Directors of the Human Milk Banking Association of North America (HMBANA); Allen Foegeding, Fellow of the Royal Chemical Society, UK; David Green, Carl R. Fellers Award; Keith Harris, William V. Cruess Award for Excellence in Teaching; Keith Harris, Food, First place for Innovation Fair at the NC Agriculture and Biotechnology Summit; Keith Harris, E.B. Knight Award; Clint Stevenson, E.B. Knight Award; Todd Klaenhammer, Tissier Medal from the Japan Bifidus Foundation; Clint Stevenson, Gertrude Cox Award for Innovative Excellence in Teaching and Learning with Technology; Clint Stevenson, Two awards for “The Ice Cream Makers” video (collaborative with DELTA and Howling Cow); Ken Swartzel, BAE Outstanding
Alumnus Award; **Danesha Carley**, Green Brick Award; **Elisabeth Meyer**, NACTA Educator Award; **Julieta Sherk**, NCASLA - Merit Award; **Julieta Sherk**, Certificate of Engaged Teaching; **Julieta Sherk**, Community Engaged Scholarship Institute; **John Dole**, Alex Laurie Award; **Penelope Perkins-Veazie**, Outstanding Researcher; **Anthony LeBude**, Friends of Southern IPM Bright Idea; **Dennis Werner**, Kim Powell Award for Outstanding Contributions to the Horticulture Industry; **Thomas Ranney**, Fellow, American Society for Horticultural Science; **Brian Whipker**, Outstanding Book Award - American Society For Horticulture; **Brian Whipker**, Outstanding Newsletter; **Dennis Werner**, Outstanding Fruit Cultivar; **Brian Whipker**, Outstanding Newsletter; **Joe Neal**, Friends of Southern IPM Bright Idea; **Lucy Bradley**, Opal Mann Green Engagement and Scholarship Award; **Lucy Bradley**, Henry M. Covington Extension Award; **Lucy Bradley**, Blue Ribbon Extension Communication Award; **Lucy Bradley**, Visionary Leadership Award; **John Dole**, Fellow, American Society for Horticultural Science; **Todd Wehner**, Lifetime Achievement Award; **Helen Kraus**, J. Creighton Miller, Jr., Distinguished Educator; **Bryce Lane**, Emmy Award - Information/Instructional Series; **Lucy Bradley**, Outstanding Education Materials; **Cameron Lowe**, Excellence in Teamwork - Joint Council of Extension Professionals; **Carmen Long**, Continued Excellence Award - FCS - Southern Regional; **Carmen Long**, Continued Excellence Award - FCS - Southern Regional; **Spring Byrd**, Excellence in Teamwork - Joint Council of Extension Professionals; **Spring Byrd**, North Carolina Cooperative Extension, Administrative Leadership Award – State; **Wendy Boss**, Charles Reid Barnes Life Membership Award; **Thomas Wentworth**, Elizabeth Ann Bartholomew Lifetime Achievement Award; **Jose Alonso**, World's Most Influential Scientific Minds; **Chad Jordan**, Alumni Distinguished Undergraduate Professor; **James Mickle**, Thank A Teacher Award – NC State; **Anna Stepanova**, Thank A Teacher Award – NC State; Anna Stepanova, CALS Outstanding Research Award; **Ignazio Carbone**, Ruth Allen Award; **H. Shew**, Teaching Award of Merit (NACTA); **Ignazio Carbone**, University Faculty Scholar; **Jesse Grimes**,
National Turkey Federation Research Award; **Lynn Worley-Davis**, Outstanding Faculty Adviser Award; **Lynn Worley-Davis**, Poultry Science Association Early Achievement Award for Teaching; **Lynn Worley-Davis**, CALS Outstanding Alumni Award; **Michael Wineland**, Phibro Extension Award; **Benjamin Chapman**, University Faculty Scholar; **Sarah Kirby**, Residential Green Design Award; **Sarah Kirby**, Educational Technology Award; **Andrew Behnke**, Outstanding Subject Matter Program Developed by a Team Education; **Kimberly Allen**, Gertrude Cox Award for Innovative Excellence in Teaching and Learning with Technology; **Sarah Kirby**, Housing Impact Team Award; **Kimberly Allen**, Professional Development Award; **Annie Hardison-Moody**, Opal Mann Green Engagement and Scholarship Award.

**H. Students**

**SFY 2014-2015 Student Summary**

- 339 [386 (↓12%), 2013] students enrolled in the Agricultural Institute
- 2,418 [2,332 (↑4%), 2013] students in the undergraduate programs
- 1,011 [922 (↑10%, 2013] students in the graduate program.
- There were 320 beginning freshmen and 219 new transfer students enrolled in the undergraduate program, 289 new graduate students and 125 beginning and new transfer students in the Agricultural Institute.
- For admitted freshmen in 2014, the average SAT total was 1225.
- The average weighted high school GPA was 4.42.
- 59% of students were in the top 10% of their high school graduating class.
- CALS incoming freshmen received 6 of the 41 Park Scholarships.
- The College had 67 incoming University Honors students, 179 University Scholars students, 268 CALS Honors students and five incoming Jefferson Scholars.
• The College awarded $914,005 in scholarships to more than 550 students during the 2014-2015 academic year.

• Thirty-eight student clubs and organizations were affiliated with the College, and 23 students served as CALS Ambassadors.

• 170 Associates degrees, 591 Bachelor’s degrees, 188 Master’s degrees, and 56 doctoral degrees were awarded (please note that these are preliminary datasets and do not include summer school graduates).

Honors and Awards (43 awards)

Maryanne Perrin, a doctoral student in food, bioprocessing and nutrition sciences, won a fellowship to continue her Ph.D. research, Testing Donor Exclusion Criteria to Increase the Supply of Donor Milk: Are Lactation-Duration Based Exclusions Justified?.

Hope Lima, master’s degree student in animal science, won in the M.S. student category for her research poster presentation, Effects of methylating vitamins and docosahexaenoic acid (DHA) supplementation on intra-uterine growth retardation in a feed-restricted swine model.

Yihang Li, a doctoral student in animal science, was a finalist in the highly competitive Proctor and Gamble graduate student paper competition for his research, Characterization of the alterations in the differentiation potential of porcine mesenchymal stem cell caused by neonatal dietary calcium nutrition.

Erin Beasley and Crystal Cain were medalists at the HOSA: Future Health Professionals National Leadership Conference (NLC) in Orlando, Fla. Beasley won first place and Cain took second in the Veterinary Science competition at the week-long conference. Both are animal science students.

Colt Nash was the first NC State student to win a Beacon of Enlightenment scholarship from the University of Adelaide. Fresh from earning his master’s degree in poultry science, Nash began his studies toward a Ph.D. in immunology/infectious disease,
focusing on viral gene expression in hepatitis C-infected liver cells. This scholarship opportunity is the product of a growing collaboration between NC State and the University of Adelaide. The two institutions have a strategic partnership to advance research collaboration and academic exchanges across areas of complementary strength and expertise.

David Rosero, who received his doctorate in animal science in December, received the Emerging Scholar Award by the Southern Section of The American Society of Animal Science. His doctoral research focused on the nutritional value of lipid sources and demonstrated, for the first time in reproducing pigs, that lactation essential fatty acid level is directly related to subsequent reproduction level and this phenomenon is increasingly important with advancing sow age.

Catherine McVey [Animal Science] was named a Goldwater Scholar for 2015

Evan Baker [Hort] received the American Society for Horticulture (ASHS) Science Outstanding Undergraduate Horticulture Student award.

Kara Pittman [Hort] was nominated for the ASHS Scholars award

Stormie Hollish, Tracy Thomasson, and Ethan Mason [Hort] received the ASHS Collegiate Scholars award.

Adam Fisher, was awarded an National Science Foundation Graduate Research Fellowship [Plant Biology].

Julie Hicks [Animal Science] honored as emerging scholar for 2014

Lauren Mabry {Animal Science] wins first place in Graduate Student Competition at SSAS 2014.


Nick Basinger [Hort, MS student]: First place, MS student presentation, Southern Weed Society; First place, weed science presentation, Southeast Regional Fruit and
Vegetable Conference; First place, student presentation, American Society of Enology and Viticulture; First place, student presentation, Eastern Section.

**Sushila Chaudhari** [Hort, PhD student]: First place, graduate student poster, ASHS; - Second place, PhD poster, Weed Science Society of America; Outstanding, PhD student presentation, Southern Weed Society.

**Lesley Judd** [Hort, PhD student]: - Second place, graduate student paper, International Plant Propagators Society; Third place, Bryson L. James Student Research Competition, Southern Nursery Association; Richard T. Meister Scholarship, American Floral Endowment.

**Jonathan Kressin** {Hort, MS student}: Third place, ASHS Scholars Ignite!

**Elizabeth Riley** [Hort, PhD student] First place, Bryson L. James Student Research Competition, Southern Nursery Association.

**Joe Wolfe** [Hort, MS student] First place, MS poster, Weed Society of America.

**Ted Yap** [Hort, MS student] Second place, Bryson L. James Student Research Competition, Southern Nursery Association, Graduate Research Fellowship Awards from the National Science Foundation, USDA-AFRI, China Scholarship Program, and NIH-MBTP programs.

**Maryanne Perrin** was a winner for the Lactation Research Interest Section in the "American Society for Nutrition Emerging Leaders in Nutrition Science Poster Competition" at Experimental Biology in Boston. She also won a CALS Outstanding Graduate Teaching Assistant award.

**Tyler D. Sowers** won the Hubert J. Byrd Scholarship from the Soil Science Society of America.
**Elizabeth Gillispie** won ASA-CSSA-SSSA Future Leaders in Science Award; Hugh Hammond Bennett Scholarship, awarded by the Hugh Hammond Bennett Chapter of the Soil and Water Conservation Society for recognition of advanced study that will contribute to sound use of soil resources.

**Iliana Santillan-Carrilo** received the National Council on Family Relations Honors Student Award.

**Heather Glennon** has been honored with the NACTA (North American Colleges and Teachers of Agriculture) 2015 Graduate Student Teaching Award.

**Stine Petersen** has been honored with both the Gerald O. Mott award and the Gerald O. Mott Scholarship offered by the Crop Science Society of America.

**Rachel Atwell and Anthea Saez** were named Borlaug Fellows [Crop Sci] Thierry Besancon - 1st Place graduate student poster; Liam Vincent - 3rd Place graduate student poster.

**Alexandra Knight** won 3rd Place graduate student presentation Northeast Weed Science Society.

**Lottie Ou** earned 2nd place poster in WSSA soil and environmental aspects division; Alexandra Knight - 2nd Place Ph.D. student poster Weed Science Society of America.

**Matt Inman** won 1st place in the MS category; Charlie Cahoon won 1st place in the PhD category Southern Weed Science Society.

**Amanda McWhirt** won 3rd place at the Warren S. Barham PhD Graduate Student Paper Awards at the Southern Region American Society of Horticultural Science meeting.

**Justin Nawrocki** was presented with the Phillip M. Fields Scholarship Award at the South Carolina Aquatic Plant Management.

In the Society meeting student paper presentation competition, **Erika Haug** finished first and **Justin Nawrocki** tied for second place.
Kevin Curry received the NACTA Graduate Student Award of Merit, and the Southern Region American Association of Agricultural Engineers (AAAE) Distinguished Research Poster.

Amber Willis received the Southern Region AAAE Distinguished Research Manuscript award.

I. Fundraising

The CALS College Advancement structure is now organized around Individual Philanthropy and Corporate and Foundation Philanthropy with development officers taking a more donor-centric approach by aligning prospects within top giving capacities with projects throughout the College.

During SFY14-15 CALS Advancement acquired over $8.3 million toward a $9 million goal for stakeholders’ 50% financial support for planning money for the Plant Sciences Initiative; this was a collective effort of college administration, commodity organizations and CALS Office of Development.

NCARS and CALS Development continued to work with the NC SweetPotato Commission to complete the Covington Endowment of $1.25 million. The commission has since launched an effort to raise another $1 million.

CALS Research Foundation allocated $18,700 for research station improvements and equipment purchases from the Smith Initiative for Research Stations and Field Laboratories.

J. Administration Changes

The following were named new College of Agriculture and Life Sciences department heads: Dr. Eric “Rick” Davis, Department of Plant Pathology; Dr. Carolyn Dunn, Department of Youth, Family, and Community Sciences; and Dr. Clay Clark, Department of Molecular and Structural Biochemistry.
Dr. Mike Yoder was named associate Extension director and state program leader for 4-H and family and consumer sciences.

Dr. Wes Watson is the new Interim Department Head for Entomology.

Dr. Mike Vepraskas is the new Interim Department Head for Soil Science.

We created a new Extension director of marketing and communications position effective January 1, 2015 (Justin Moore).

Completed staffing and organizational structure for NCARS, including hiring of CALS Director of Partnership Development (Deborah Thompson) and CALS Grant Proposal Developer (Christy Sandy).

K. Recommendations

Extension: In August 2014, NC State’s Extension Service launched a strategic plan to ignite a renewed organizational vision and establish an unprecedented level of service across the state. We’ve faced more than $14 million in recurring funding reductions since 2008, resulting in the loss of 242 positions in the past four years (170 county | 72 campus).

To continue meeting the needs of North Carolinians, we must be steadfast with our strategic plan and revamp the organization’s operating model and identity.

Research: NC Ag Research Service needs the ability to carry over a portion of state funds across fiscal years in order to bank funding for large purchases critical to the research effort, including laboratory and farm equipment, supplies and startup funding. Budget management could also be improved with flexibility to spend against the promise of federal funding.

Concerns

The current GSSP policies prevent the college from recruiting international grad students (hinders research). No additional funds to attract outstanding graduate students.
Outdated buildings and labs eliminating the competitive edge with other universities. Additionally, the lack of personnel on research stations and field labs is a barrier to maintaining our research enterprise.

With current starting salaries, we are usually able to attract new faculty hires, but the lack of a reliable salary increase structure results in salary compression and potential loss of our most productive mid- and senior career faculty to other institutions or companies.

A lack of internal funds for research equipment replacement and purchases. Similarly, continual transfer of technician costs to commodity group funding continues to cause concern among those stakeholders.

Years of budget reductions and reversions have left the college with an increasing number of gaps in research areas in which we have implicit and explicit agreements with the State and stakeholders to cover, including research areas associated with significant economic potential to the state.