

# Annual Report to the Chancellor | College of Agriculture and Life Sciences (2010-2011)

## Changes in the Service Environment

For the third straight year, the difficult economic environment is a major factor impacting our programs. Indeed, the economy has under-performed for so long now it may no longer qualify as a change in the service environment. As of this writing, the state budget is still being developed, so we do not yet know exactly how we will be impacted. However, it seems likely we will experience yet another significant cut in state funding. At the same time, of course, it is likely that federal funding will also decrease, while funding cuts at the county level will erode support for North Carolina Cooperative Extension programs. We have already seen an effort at the county level to reduce the Cooperative Extension program in Wake County. Perhaps the lone bright spot in the funding picture is the outpouring of support for our programs we experienced across the state when it appeared budget cuts might be even more severe. It seems clear that the North Carolinians with whom we work value our programs.

Beyond the economic picture, there are other societal trends that may eventually affect our programs. While gasoline prices have decreased recently, fuel costs approaching \$4 per gallon may spur interest in alternative fuels. We have an active program focused on bioprocessing and biofuels production. We may need to put more resources into this area as interest in alternative and renewable energy sources rises.

We continue to see increasing interest on the part of many consumers in what might best be called alternative agriculture. Many consumers seem to want to know where their food comes from and how it was produced, while interest in small-scale farming seems to be growing. We have responded with programs such as the Center for Environmental Farming Systems and the Plants for Human Health Institute on the NC Research Campus in Kannapolis. An indication of this interest is the 10% Campaign, a marketing effort of the Center for Environmental Farming Systems and Cooperative Extension that encourages consumers to spend 10 percent of their food dollars on locally sourced foods. The campaign began in July 2010, and since that time has attracted nearly 3,600 individuals and nearly 300 businesses that have reported spending a combined \$4.3 million on local foods. Piggly Wiggly grocery store chain is among the most recent campaign participants, announcing that it would join the campaign, pledging to source 10 percent of its produce from local growers.

Finally, there may be a growing realization among many people of the importance of agriculture as the world's population continues to grow. Global population is expected to reach 9 billion people by 2050, and many experts believe a 70 percent increase in agricultural production will be needed to feed the world's population. A reliable, affordable food supply is seen as a key component in avoiding social unrest, particularly in the developing world. Agricultural programs such as those in our college may be more highly valued if they are seen as an important element in meeting the needs of a growing global population.

## Initiatives: Major initiatives and/or changes to programs or activities

We continue to focus on the following overarching goals.

- Providing students and Cooperative Extension clientele with the knowledge and skills they need to succeed in a rapidly changing world;
- Producing well-trained, socially responsible graduates who are ready to contribute to North Carolina and make a difference in their communities;
- Fostering economic vitality by generating and applying science and technology that support robust agricultural and life sciences industries;
- Conserving and improving the state's natural resources and environment;
- Improving the health, well-being and quality of life of North Carolina's individuals and communities.

Most of our major initiatives are mentioned elsewhere in this report. The exception is a program we are developing called AMPLIFY, Agrosphere Modeling for Producing Large Increases in Food Yield. This initiative is designed to discover patterns, networks and key variables underlying agricultural input-to-yield relationships.

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Beginning July 1, 2011 the Department of Sociology and Anthropology, which has been jointly administered by CALS and the College of Humanities and Social Sciences, will move to CHASS, although faculty whose focus is rural sociology will remain in CALS.

We have begun a major and much-needed renovation of the NC State University Phytotron. This 3-year project is funded by a \$1.79 million National Science Foundation grant.

In the academic arena, we signed an agreement with Richmond Community College that allows specific RCC associate in science degree graduates admission as juniors to the NCSU poultry science program. Called a "2+2" program, this agreement guarantees NC State enrollment for RCC students who have earned a two-year associate's degree including the courses required for NC State's poultry science baccalaureate program and have maintained an adequate GPA.

### **Diversity: Initiatives and Progress**

The College is committed to building a diverse and inclusive community. There are several critical building blocks that provide a solid foundation for diversity. First, professional development workshops focused on building cultural awareness and competence are a proven strategy for improving work environments. CALS sponsored the Opening Doors program for the past six years, reaching 294 faculty and staff. Using open discussion, self-examination and objective social systems analysis, this program provides a framework for increasing diversity awareness and enhancing a person's ability to create an inclusive organization. Sessions include a three-day retreat that is held three times during the calendar year. In 2010, CALS began surveying Opening Doors participants to evaluate the program. Consistently, feedback from Opening Doors indicates that the workshops are very effective. For example, for the most recent workshop, the mean scores for all Opening Doors evaluation question items ranged from 4.2 to 4.8 out of 5. Also, 100% of the participants either agreed or strongly agreed that: 1) the session was excellent overall, 2) they increased their ability to advocate for diversity, 3) they plan to change behaviors to be more inclusive, and 4) they plan to be an ally for diversity in their professional lives.

Second, in addition to training and staff development, systemic organizational change requires comprehensive, ongoing initiatives involving many members of the organization at all levels who are strong advocates for inclusion. One such group of allies is the interdisciplinary CALS Diversity Council, which was formed in 2008 and has met monthly since its inception to develop and implement strategies to address priority needs. Contributing to the success of female faculty and faculty of color is a council priority. As an example, for at least the past seven years, CALS has sponsored a Female Faculty Networking Event. In the past three years, a professional development component was added to the event, wherein women gain education and insight on topics they identified as salient to their success as faculty. This year, the session focused on "The Art of Publishing" and included CALS faculty panelists who serve as editors in chief of leading journals. Panelists shared strategies for success as well as pitfalls to avoid when preparing and submitting manuscripts as well as revising manuscripts. Nearly 30 female faculty participated.

Third, another priority area is increasing student diversity. The CALS Office for Diversity Affairs and Diversity Council continue to engage in innovative programming to achieve this aim. For example, enrollment of male students from underrepresented groups lags behind that of their female counterparts by more than 50% in some cases. In its third year, the Creating Awareness of Agriculture and Life Sciences Disciplines, Degree Programs and Discoveries Project (CAALS 3D) was developed in response to this need. CAALS 3D serves male NC School of Science and Math (NCSSM) students from underrepresented groups to increase their awareness and interest in academic programs, research and career fields within the food, agricultural, environmental and life sciences. Twenty male NCSSM students worked with 11 CALS faculty in their labs for one week during July 2010. The CAALS 3D Program launched the Mentor Guided Research Component in 2010 in which two select students who participated in CAALS 3D during the summer were able to work with faculty for 5 to 10 hours per week throughout the academic year. The Preparing for the Agriculture and Life Sciences (PALS) outreach program targets limited resource, first-generation middle school students of any ethnicity. The literature is clear that limited resource, first-generation students need recruitment programs that reach them early in the pipeline to college. This one-week residential summer science enrichment

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program held in the summer 2010, its second year of existence, reached 20 rising 7<sup>th</sup> and 8<sup>th</sup> graders from Eastern North Carolina. CALS also participates in the CHAMPS visitation programs for underrepresented undergraduate students led by the NCSU Graduate School and Office of Diversity and Inclusion. CHAMPS focuses on private Historically Black Colleges and Universities (HBCUs). CALS also held its Explore visitation program to make undergraduate students from public HBCUs, namely NC Central University, NC A&T State University, and Fayetteville State University, more aware of graduate programs in agricultural and life science disciplines. Through a competitive selection process, Mr. Courin Williams, an NC Central University student who participated in Explore, will be participating in the 10-week Synthetic Biology summer research program beginning June 2011. Additionally, the Dean's Graduate Research Assistantship, now in its second year, was developed to recruit new graduate students from underrepresented groups. There are currently two doctoral students and one incoming doctoral student who are recipients of the assistantship. The Dean's Graduate Research Assistantship has increased African-American doctoral student enrollment in CALS by over 20%. Retention of underrepresented students is also a priority. The College continues to teach sections of the USC 110D course for first-year students from underrepresented groups. The course outlines critical skills for time management, note-taking, study techniques, test-taking, stress management and decision-making. The CALS section of USC 110D incorporates a Guest Speaker Series to introduce students to professional role models from different industries. Past evaluations show that students who completed the course have a significantly higher first semester grade point average than similar students electing not to take the course. Also, the College continues to support and provide a faculty advisor for the student chapter of the National Society of Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS) and the Minority Association of Pre-Health Students (MAPS). In addition, the College sponsors personal, academic and professional development activities for MANRRS and MAPS students throughout the year. The CALS Office of Diversity Affairs is committed to linking underrepresented students with opportunities to conduct research. In the 2010-11 fiscal year, the Assistant Dean for Diversity, Outreach and Engagement assisted 5 students in gaining academic year and summer research opportunities in top laboratories within CALS. Faculty in the Biological Sciences Department offer two retention programs: 1) Reaching Incoming Student Enrichment (RISE) Program and 2) Howard Hughes Research Scholars (HHR) Program. The RISE Program provides a six-week introduction to scientific research. The two-year HHR Program provides outstanding sophomore, junior and senior undergraduates with experience conducting scientific research in an NCSU laboratory during the academic year and in the summer.

Fourth, the Latino student population is increasing within CALS. In order to address the specific and unique needs of this audience and contribute to their success at NC State as well as build on Latino student recruitment, the CALS Diversity Council established the CALS Latino Initiative, which is spearheaded by a subcommittee of council members. The Latino Initiative consists of five main components: 1) Each One Reach One Faculty-Student Mentoring Program, wherein CALS faculty have received training on mentoring and will be assigned up to two student protégés in Fall 2011; 2) Latino Speaker's Bureau to address the lack of Latino scientists serving as role models in the K-12 schools (e.g., Career Days); 3) Bone Scholars Program and Service Project, wherein Bone Scholars/student mentor high school students from migrant farm working backgrounds similar to their own; 4) community/parent outreach component in partnership with Juntos Extension Program; and 5) component for new Latino students and their families during CALS New Student Orientation.

Finally, the College, through NC Cooperative Extension, continues to play a major role in the national Change Agents States for Diversity project, which includes 17 states and 20 institutions. This project continues its efforts to build the capacity of the land-grant system to function inclusively and effectively in a multicultural world and to set standards and implement a vision for supporting healthy, thriving, culturally diverse communities through extension, research and academic programs.

### **Instructional Program Advances, including curriculum development and program review**

Curriculum reform continued in the 2010-2011 academic year. At the undergraduate level, the Agricultural Environmental Technology degree title was changed to Agricultural and Environmental Systems Management in order to refocus the program and make it more distinctive, improve its environmental component while maintaining its connection with agriculture. It will have two concentrations, one in Agricultural Systems and one in

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Environmental Systems. The undergraduate B.S. degree program in Soil and Land Development was approved and will begin accepting majors in the Fall 2011. In addition, major curricula revisions were made to the undergraduate degrees in Biological Sciences, Food Science, Poultry Science, Biological Engineering and Zoology. Minor curricula revisions were made to the Agricultural Education, Microbiology and Nutrition degrees. No curriculum changes were made at the graduate level during this academic year. Two new undergraduate certificate programs, Biological Sciences and Fundamentals of Entomology, were approved and will be offered both on-campus and via distance education. At the graduate level, one current non-thesis Master's program, the Master of Family Life and Youth Development program, was approved to operate as an Option B program, allowing for the operation of the program with a single adviser and eliminating the final oral exam requirement. The Agricultural Institute underwent a comprehensive accreditation review, and as a result, revisions were made in all eight options to meet review standards. Also all courses were renumbered to the 100 level, which is consistent with the numbering for other programs in North Carolina offering Associate of Applied Science degree programs. In addition, an Associate of Applied Science Certificate in Agribusiness and a concentration in Crop Production were approved for the Agricultural Institute. Twenty-six new undergraduate courses and 15 new graduate courses were approved; 34 undergraduate courses and six graduate courses were revised; and nine undergraduate courses and one graduate course were dropped. In addition, four new Agricultural Institute courses were approved, seven were revised and one course was dropped. Undergraduate and graduate program review and assessment continued to be a point of emphasis. The departments of Environmental and Molecular Toxicology, Soil Science and Microbiology underwent comprehensive reviews, and the Bioinformatics graduate program was reviewed, with external peers participating. When seniors were asked to rate the quality of instruction in their major, 96% rated their education as either Excellent or Good, and 97% reported that the faculty set high expectations for learning.

### **Research: Volume of activity and achievements of significance**

The North Carolina Agricultural Research Service (NCARS) is the principal state agency responsible for agricultural and life sciences research, providing the scientific foundation for CALS Academic and Extension programs. Collaborators include CNR, PAMS, COE, CHASS, CVM, the School of Human Environmental Sciences at UNC-G and School of Agriculture and Environmental Sciences at NC A&T State University. The NC Research Campus at Kannapolis involves collaborations among NCSU, UNC-CH, UNC-G, UNC-C, NCCU, NC A&T, ASU, USDA and Duke University. Development continued at two aquaculture research and demonstration sites; environmental chambers are being built in the animal systems air quality research building, and the integrated Dairy Enterprise System is completing its first year of operation. Significant progress was made on renovations to move aquatic species from the Biological Resources Facility to a dedicated facility in Grinnells, and the first phase of the NSF-ARI-R2 funded renovation of the Phytotron began. This project should be complete in 2013, providing a state-of-the art controlled environment facility with containment for research involving high-risk plant pathogens and other microbes.

NCARS personnel, supported by federal, state, grant and/or gift funding, include 369 research scientists; 629 graduate students, researchers, research assistants and postdoctoral students; and 537 technicians and support staff. Many employees have joint appointments with Academic Programs and/or Extension. Faculty and support personnel oversee 500 federal, state and regional research projects supporting over 70 commodities, related agribusinesses and life sciences industries. CALS scientists submitted 1,045 funding proposals, requesting \$329,726,528; 664 proposals were awarded, totaling \$59,855,572. Research expenditures totaled \$122,948,276. NCARS development activities generated \$0.9 million in endowments and other support for college research; pending requests total \$6.8 million to support AMPLIFY, CEFS and the Sweet Potato Campaign. Faculty filed 39 invention disclosures; 19 new plant varieties were released; 19 patents were issued and 36 commercialization agreements were executed dealing with NCARS inventions and technologies.

Representative achievements of NCARS research activities include the following.

**The Plants for Human Health Institute.** The Institute provides research and extension programs aiming to enhance the nutritional value of fruits and vegetables and related compounds to improve human health, prevent disease and contribute to the economic vitality of NC agriculture. Through the Institute, the College of Agriculture and Life

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Sciences supports faculty from the departments of Horticultural Science; Food, Bioprocessing and Nutrition Sciences; Plant Biology; and Agricultural and Resource Economics. In addition to state appropriations, the Institute has received since opening \$2.1 million in gift donations and \$5.45 million in federal and private competitive grants, including \$200,000 from the Golden LEAF Foundation, \$1.42 million from the NC Tobacco Trust Fund Commission, \$2 million from NCD&CS and USDA, \$780,000 from UNC General Administration and \$1.05 million from commodity groups and other private sponsors. An endowed David H. Murdock professorship was awarded to Dr. Mary Ann Lila, Institute director. The Institute added two additional faculty members in plant metabolic pathway engineering and pharmacogenomics; four research staff members; one graduate student; one extension associate, one extension assistant and four interns, for a total of 57 faculty, staff and personnel support. The Institute recently received a gift of cabbage germplasm from Monsanto Company. Construction of 9,000 square feet in greenhouse space, to be completed in summer 2011, will bring total greenhouse space to 12,000 square feet. Contacts: Steve Lommel, Mary Ann Lila

**Health and well-being.** Foundational work with preclinical drug testing in mice has been translated to identification of gene variants that predispose humans to acetaminophen liver toxicity. Comparison of mutations in the respective p53 genes associated with ovarian cancers in humans and domestic hens revealed similarities that will allow accelerated studies for chemoprevention and biomarker development in the bird model. Advanced methodology and software that analyze genetic associations are being used to identify genetic variants that predict common yet complex diseases that result from an interplay of genetic and environmental factors. NCSU researchers have developed and distributed a software package that is being tested around the world to investigate chemotherapy response, HIV microbiome growth, response to acupuncture treatment, neurotoxicity after platinum therapy and other human health concerns. Contacts: David Threadgill, James Petitte, Alison Motsinger-Reif

**TAK1 kinase signaling control.** Research revealed that TAK1 kinase signaling controls cell death and survival in tissues and cancer cells. This observation raises new approaches to modulate cell viability in *in vivo* tissues and tumors. The discovery is also important for regulation of tissue damage-associated inflammatory diseases such as Crohn's disease, suggesting that enhancing TAK1 signaling may be beneficial for preventing tissue damage in several specific tissues. The findings may also evoke research to develop new therapeutic drugs for inflammation and cancer. Contact: Jun Tsuji

**Estrus synchronization improves sow productivity, longevity and profitability.** Misdiagnosis of estrus is the most common management error on U.S. swine farms, occurring on a regular basis on over 60% of farms. These errors reduce farrowing rates by 10 to 15% and litter size by one to three pigs. Estimates suggest the cost of errors to the U.S. swine industry is \$30 to \$90 million annually. Researchers in the Department of Animal Science worked with InterVet, Inc., the NC Pork Council and the National Pork Board to develop management strategies for swine estrus synchronization. This work led to the first FDA approved product for estrus synchronization in mature swine. Implementation of estrus synchronization on farms significantly reduced mistakes in detecting estrus, and when this occurred, reproductive performance, sow longevity and profitability all increased. Contact: William L. Flowers

**Advances in hybrid striped bass production.** Hybrid striped bass production is the fourth largest type of aquaculture in the U.S.; however, production is static at about 14 million pounds. Major production advances, in the context of the current high-cost, low-price environment, will depend on superior breeding stock that are disease free and produce superior growth rates; cultural or management strategies to reduce costs; and economical compliance with environmental requirements for water discharged from farms. NCSU's domestication of striped bass and white bass opened the door to selective breeding of a genetically improved, high-performance hybrid striped bass while providing a reliable alternative to collection of wild broodfish for spawning. Genetic and protein biomarkers (insulin-like growth factor) can be used to instantaneously assess growth status, which allows for rapid assessment of variables that best promote fish growth, reducing the length of growout studies by 50%. Implementation of a pulsed feeding regimen has reduced labor and feed costs by 10 to 15%. Nutrient loading in pond effluent can be reduced 40% by reducing feed requirements and improving feed efficiency. Contacts: Craig Sullivan, Russell Borski

**Public policy impacts honey bees.** Research on the cost of diseases to the honey bee pollination industry has not

properly characterized and measured the economic impacts of bee disease and has failed to recognize the role played by mobile pollinators and pollination markets. An NCSU researcher developed and published more accurate and rational estimates of these costs. Public policy has been influenced in recent years by concerns regarding pollinator adequacy. The honey subsidy program and recent changes in the Conservation Reserve Program are two examples. Consistent and defensible estimates of the costs associated with honey bee diseases and pollinator adequacy will help enlighten public policy debate and decisions around this issue. Contact: Walter N. Thurman

**Supporting a vibrant sweet potato industry.** Per capita sweet potato consumption grew from 3.2 pounds annually in 1994 to 6 pounds today. Consumption is expected to continue to grow to as much as 12 pounds annually by the end of the decade. Most of the sweet potatoes grown to meet increased demand have come from North Carolina. Our growers have benefitted and stand to continue to benefit from increased demand. Collaborative research in the departments of Biological and Agricultural Engineering, Horticultural Science and Food, Bioprocessing and Nutrition Sciences is developing new, more effective ways to harvest, store and process sweet potatoes destined for processing into fries, one of the factors that is driving demand. Automated, environmentally controlled sweet potato storage, which NCSU pioneered and continues to refine, is essential for growth of the processing industry. Effective storage allows growers to provide processors with sweet potatoes year round, and processors will not make processing facility investments without the promise of a year round supply of sweet potatoes. North Carolina now has 95 percent of the controlled environment sweet potato storage in the nation, and North Carolina growers are uniquely positioned to be the major beneficiaries of increased sweet potato demand. Contact: Mike Boyette

**Plants and human environments.** The ornamentals breeding program is developing superior plants and germplasms with greater adaptability, reduced need for pesticides, improved environmental quality and greater value for growers and consumers. Six new ornamental plant varieties were released in addition to three new ornamental sweet potatoes. All of these superior varieties are available in the market, and most are grown by North Carolina nurseries. One exceptional new nursery cultivar can potentially generate wholesale sales of \$1 to \$2 million, and associated retail sales, including installation, can be twice as much. Contacts: Tom Ranney, Dennis Werner, Craig Yencho

**Improving poultry health, performance and profitability.** Diseases, health treatments and less than optimum feed efficiency cost the poultry industry hundreds of millions of dollars per year. CALS poultry researchers have identified genetic lines of chickens that exhibit significant differences in susceptibility to infections; have established that certain probiotics (potential alternative to antibiotics) in poultry feed increase energy available to the immune system, resulting in more rapid immune response to disease challenges; and have found that inclusion of large particles of corn in broiler feed stimulate gizzard function, reduce effects of anti-nutrition factors and improve digestion efficiency, reduce fecal nitrogen waste and improve feed efficiency. Some of these approaches have already been tested in commercial settings and are in use in the industry, potentially benefitting the poultry industry by hundreds of millions of dollars and improving animal health and industry sustainability. Contacts: Matthew Koci, John Brake

**Reduced pesticide use in apple production.** Research and extension programs focused on developing and implementing reduced-risk pest management strategies for apple insects, particularly the codling moth, continued in 2010. Methods were developed to monitor pest populations for resistance to various insecticides, which helped growers avoid using ineffective materials. And pheromone-mediated mating disruption was tested for management of codling moth and oriental fruit moth. An educational program told apple growers and the pest control industry how to implement these strategies, and pest and beneficial arthropod populations were monitored in 30 orchards to assess impact. The result: broad spectrum insecticide use declined more than 70% between 2007 and 2010. North Carolina apple acreage under mating disruption strategies increased from 3% in 2006 to almost 60% in 2010. Prior to this project, overall damage due to codling moth and oriental fruit moth averaged 3.2% of the state's apple crop; by 2010, overall damage by these insects declined to 0.15%. Contact: James Walgenbach

**Benefits of controlled drainage in cropping systems.** Controlled drainage systems have been documented to reduce nitrogen losses to surface waters by 25 to 50% depending on soil condition as well as conserving water and

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increasing crop yields. The State of North Carolina accepted controlled drainage as a BMP for reducing nitrogen and phosphorus loads to surface waters, and state and federal cost share programs were implemented to help farms install the BMP. Since inception of the program, controlled drainage has been installed on over 400,000 acres of cropland in the state and could be applied to as many as a million acres of drained cropland. Maintained and managed properly, controlled drainage on 400,000 acres reduces nitrogen loads to surface waters by 4 million pounds annually. And at current commodity prices, yield increases on those acres could increase farm gate crop value by \$24 million. The models developed from this work are being put to use in planning water management systems in other states and countries as well as creating more effective methods of land treatment of wastewaters on drained soils. Contact: Wayne Skaggs

**Identifying and exploiting fungal resistance in corn.** USDA supported research at NC State is seeking to identify and map new sources of fungal resistance from diverse corn germplasm. Efforts are concentrated on two important fungal diseases: Gray Leaf Spot and Southern Corn Leaf Blight. Scientists are taking advantage of the natural variation in corn grown around the world to generate near-isogenic lines and develop controlled environment assays in order to quantify resistance at the phenotypic and molecular levels. This collection of diverse corn lines will enable researchers to characterize disease resistance in the field, map quantitative trait loci in appropriate populations and ultimately create fungal disease resistant lines and hybrids for the future. Contact: Peter Balint-Kurti (USDA)

### **Extension: Initiatives and public service activities**

In calendar year 2010, NC Cooperative Extension's (NCCE) educational programs and information were used by 5,818,559 residents. Feedback from program participants put the value of programs at \$348,696,229. Non-degree credit hours of training were offered to 636,921 participants for a total of 77,147 hours of instruction in NCCE educational meetings, workshops, seminars and demonstrations. Extension also provided professional certification classes for over 34 programs to individuals and businesses ranging from pesticide applicators and restaurants to day care providers. In 2010, 29,547 individuals attended NCCE certification training classes. Of those attending classes, 13,526 received recertification and 7,105 were certified for the first time. NCCE volunteer commitment is among the highest among statewide organizations. Commitments to our programs are a strong indicator of the value state residents place on these programs. In 2010, 52,464 volunteers participated in NCCE programs, providing 860,583 hours of service with a value of \$17,426,801. NCCE provides educational programs and programming to schools and school children throughout the state (K-12). In 2010, Extension served 683 administrators, 3,493 teachers and 95,229 students. The value of these programs, as calculated by the university formula for K-12, was \$3,101,809.

#### **Extension Program Impacts/Highlights**

**Youth Entrepreneurship/STEM.** Students who understand the logic of math and science often become the world's most successful entrepreneurs. The NC 4-H Youth Development science, technology, engineering and mathematics (STEM) and entrepreneurship program is designed to give children the tools they need to take the lead in the global economy and make the great discoveries that will change the world. In 2010, over 65,272 youth gained knowledge in STEM subject matter areas; over the past six years more than 10,300 NC 4-Hers have started their own businesses and/or used their 4-H projects to finance their post-secondary education. Through these efforts, NC 4-H is putting new approaches to the test and supporting proven programs to advance the number of students who will excel in math and science and become the next generation of entrepreneurs.

**Military 4-H Youth Programs.** Operation Military Kids (OMK) and the 4-H Military Clubs Grant support outreach efforts of NCCE to engage children in military families. Last year, more than 250 youth participated in 22 4-H clubs on military installations using curricula involving STEM, photography, food preparation, community service, babysitting and healthy lifestyles. Through OMK, 1,681 citizens participated in 34 informational briefings, 907 military youth participated in county 4-H programs and 43 different programs reached 5,121 military youth. More than 600 military youth used the Mobile Technology Lab, 30 individuals received training to better understand military families, 45 youth gained public speaking and communication skills through Speak Out for Military Kids

training and a total of 1,165 Hero Packs (backpacks filled with specially selected items) were distributed to school-age children in military families experiencing deployment. These programs, funded through agreements and partnerships with USDA and the Department of Defense, provide \$130,000 to serve military families.

**Food Preservation/Food Safety Training/Local Foods.** With up to 70% of the estimated 48 million cases of foodborne illnesses seen in the U.S. annually being traced to food consumed outside the home, food handler education and training is a major public health priority. Since 2009, 34 food safety infosheets containing stories of outbreaks and focusing on the factors most likely to lead to a foodborne illness were developed by the Family Consumer Sciences food safety program and distributed to an estimated 10,000 subscribers and readers through various online methods, including a website ([www.foodsafetyinfosheets.com](http://www.foodsafetyinfosheets.com)), which averaged 300 visitors a day. Infosheets are used by field faculty as training resources for commercial food handlers, volunteers, consumers and producers. Additionally, three direct subscribers have reported sending infosheets to all of their organization's outlets — a total of 1,350 sites and 300 support associates. An estimated 25,000 food handlers regularly receive exposure to these publications. Food safety infosheets have been evaluated using observation methods and have been shown to be effective in positively affecting the food handling practices of the target audience (see Chapman et. al, 2010; Chapman et al., 2011). A major foodborne illness outbreak can cost an organization between \$500,000 and \$5 million in medical expenses, brand damage and loss of market share, so preventing such outbreaks can produce significant savings. Food safety infosheets are used by Wal-Mart, Publix and Compass Foods as tools to create a good food safety culture and have been modeled by the U.S. Food and Drug Administration for federal resource development.

The resurgence of local foods and home canning is good news for both the health of North Carolinians and the economic health of the state. However, after further examination of the self-reported practices of home food preservers, science-based methods are often not followed. The most troublesome issue is that over half of individuals report that they believe foodborne illness can be seen, tasted or smelled, an incorrect and potentially fatal belief. Not only is NC Cooperative Extension seen as the go-to home food preservation resource across the state (responding to an average of 1,500 preservation-focused inquiries annually over the past two years) but field faculty are also the front-line when it comes to discussing the potential to start-up small food businesses. By many accounts, the cottage food industry is growing in North America and our field faculty are fielding an increasing number of questions about how to break into the food industry. Since 2009, 55 FCS agents who identified themselves as low-experience canners have received in-depth and hands-on training related to home food preservation. Agents have conducted home food preservation workshops, using the updated materials, across the state, resulting in an estimated 2,000 new preservers being trained. The average cost of a foodborne illness is \$4,500, so avoiding illness can result in significant savings.

The FCS food safety program is also currently developing curricula and resources focusing on farmers' market managers and vendors; volunteers who work with food (including food pantries, community and school gardens and community fundraising meals) and evaluating the ability of small businesses to meet increasing demand and reduce food-safety risks.

**Energy Conservation.** The E-Conservation Residential Energy Education Program teaches citizens to save energy, lower home energy utility costs and protect North Carolina's environment. Between June 2009 and February 2011, NC Cooperative Extension conducted educational workshops, contracted with home energy raters to conduct residential energy audits and distributed home energy kits. As a result of implementing energy audit recommendations, 62% of participants reported an increase in home comfort; 80% indicated a decrease in energy use due to changes made following the home audit and 58% indicated a decrease in energy cost due to changes made following the home audit. Home energy kits included compact fluorescent light bulbs and low-flow showerheads. Approximate savings from installing compact fluorescent light bulbs were 194,835 kWh in energy use, \$19,910 in energy costs and 251,293 pounds of carbon dioxide. The installation of the low flow showerhead resulted in projected annual savings of 3,027,675 gallons of water each year, \$118,079 in energy cost, 1,306,745 kWh and 1,684,598 pounds of carbon dioxide.

**4-H: Hungry to Help.** Hunger disrupts the lives of one in five North Carolina children daily. To combat hunger, the NC 4-H Youth Development Program and the Food Banks of North Carolina, all of which are affiliates of Feeding America, our nation's largest hunger relief organization, teamed up to promote awareness of hunger in North Carolina and to make an impact in local communities through an initiative entitled 4-H: Hungry to Help. The program is engaging 4-H youth, volunteers, alumni, citizens and the NCSU family in focused efforts to plan and implement both hunger awareness programs and food collection programs

**Cook Smart, Eat Smart.** More than 65% of all meals consumed are highly processed foods prepared away from home. Eating and preparing more meals at home is an evidence-based strategy for decreasing overweight and obesity. However, many people lack the skills needed to prepare simple, quick, healthy meals for themselves and their family. Cook Smart, Eat Smart is a program that teaches basic cooking skills to help participants plan simple meals, shop for the foods they need and make healthy meals. Preliminary evaluation of the program indicates that 90% of participants are able to prepare more evening meals at home and over 60% indicate that the program helped them increase their fruit and vegetable consumption.

**10% Local Foods Campaign.** In July 2010, the Center for Environmental Farming Systems with Cooperative Extension as its key partner launched the 10% Campaign in the state. The goal of the campaign is to encourage individuals, organizations, agencies and businesses to commit 10 percent of their food dollar to local foods. Since the beginning of the program, more than 3,500 individuals and 289 business partners have reported spending more than \$4.1 million on North Carolina grown foods. Large entities like NC State University, UNC Wilmington, Blue Cross/Blue Shield, Compass Group (largest food service company in the world), 30 Piggly Wiggly groceries and New Hanover Hospital have committed to the campaign. Cooperative Extension has identified a designated local food coordinator in every county and has been key to the campaign's success. These coordinators have facilitated county government commitments to the campaign and resolutions of support and have developed the new business partnerships. In addition, through USDA funding, agents are involved in a range of county local food systems projects statewide, including providing support for beginning farmers.

**NC MarketReady spurs economic development.** NC MarketReady, which is partially funded by a USDA Rural Cooperative Development Grant (RCDG), serves as a rural cooperative development center, helping farmers structure their businesses to better take advantage of value-added markets. NC MarketReady provides educational activities such as cooperative board member training and technical assistance in the form of feasibility studies, business plans and marketing studies. NC MarketReady also provides a \$1.4 million cost share program, funded by the NC Tobacco Trust Fund Commission and NC Rural Economic Development Center, that helps farm families assess the feasibility of value-added ventures, procure federal grants for value-added startups and purchase equipment for value-added ventures. The NC Value-Added Cost Share Program (NCVACS) has provided cost-share of \$260,000 to 12 farms for feasibility studies and grant writing to support value-added operations. This funding helps farmers develop successful business plans and compete for USDA Rural Cooperative Development Grants of up to \$300,000 to develop their value-added businesses. This program will potentially leverage \$2.8 million in federal funding via USDA value-added producer grants. NCVACS has also provided \$436,040 in cost-share to 30 farms to help purchase equipment needed to develop value-added operations. Equipment purchases by producers receiving cost share assistance total \$1.13 million. 2011 marks the third year that NC MarketReady has secured a USDA Rural Cooperative Development Grant, bringing the total funding for this effort to \$625,000 through the end of the year. These funds have allowed NC MarketReady to provide educational resources and technical assistance to producer groups across the state. Among the producer groups that have received assistance and their products are Eastern Carolina Organics (organic produce), the American Prawn Cooperative (farm-raised prawn), East Carolina Soy Processors (organic soybean meal) and Hyde Fresh (bagged snap beans).

**Extension steps up after storms.** In the aftermath of some of the most devastating tornadoes in North Carolina history, Cooperative Extension field faculty, specialists and staff provided leadership and worked collaboratively with state and county Emergency Management, Farm Service Agency, and NC Department of Agriculture and Consumer Services representatives to provide public information, family services, emergency shelters, debris removal and crop damage assessments and addressed a number of critical livestock issues. Extension offices housed FEMA Disaster

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Recovery Centers and Extension personnel assisted FEMA in the Federal Relief and Recovery registration process. While the storms of April 16, 2011 resulted in millions of dollars in damages to our state, the actions of Extension professionals helped speed recovery and lessen the burden on our citizens.

### **Faculty: Honors, awards and recognition**

**Member, National Academy of Sciences** – Fred Gould, Entomology

**2010-2011 Holladay Medal** – William Atchley, Genetics and Statistics; Fred Gould, Entomology

**Fellow, American Association for the Advancement of Science** - Craig Sullivan, Biology; David Threadgill, Genetics

**Fellow, American Society of Animal Science**-Kenneth Esbenschade, Academic Programs;

**Fellow, International Society for Horticultural Science**-Sylvia Blankenship, Dean's Office;

**Outreach to Freshmen Award** – Melissa Kahn, Academic Programs

**NC State Grange Search for Excellence Team Award** - Katie Jennings, Horticultural Science; Frank Louws, Plant Pathology; David Monks, NC Agricultural Research Service; Zvezdana Pesic-VanEsbroeck, director, Micropropagation Unit; Steve Toth, Integrated Pest Management coordinator; Gina Fernandez, Horticultural Science; Garry Grabow, Biological and Agricultural Engineering; Barclay Poling, Horticultural Science; and Charles Safley, Agricultural and Resource Economics

#### **AWARDS BY DEPARTMENT**

##### **4-H YOUTH DEVELOPMENT AND FAMILY AND CONSUMER SCIENCES**

**Academy of Outstanding Faculty Engaged in Extension** - Sarah Kirby; **Alumni Outstanding Extension and Outreach Award** - Sarah Kirby; **Outstanding Extension Service Award** - Sarah Kirby,

##### **AGRICULTURAL AND EXTENSION EDUCATION**

**Distinguished Teaching Award** - Barry Croom; **CALS Outstanding Faculty Adviser Award** - Mark Kistler; **Rising Star Award** - David W.W. Jones; **Teaching Fellow Award**- Barry Croom; Melissa Hendrickson, Mark Kistler; **Association of Public and Land-grant Universities 2010 Regional Teaching Award** – Elizabeth Wilson

##### **AGRICULTURAL AND RESOURCE ECONOMICS**

**Fellow, Agricultural and Applied Economics Association**-Walter Thurman; **Contributions to Continuing Education Award** - Guido van der Hoeven; **Extension Materials Award (Bulletin Category)** - Theodore Feitshans, Charles Safley, **Outstanding Chapter Speaker Award** - Michael Walden; **Outstanding Extension Publication Award** - Charles Safley; Olha Sidorovych; **Outstanding Graduate Instructor Award** - Daniel Phaneuf; **Research Leadership Award** - Barry Goodwin; **Teaching Award of Merit** - Herman Sampson

##### **ANIMAL SCIENCE**

**Animal Growth and Development Award** - Jack Odle; **Penn State Department of Dairy and Animal Science Distinguished Alumnus** - Bob Mowrey; **Extension Award** - Todd See; **Industry Service Award** - Joe Cassidy; **National Pork Board Swine Industry Award for Innovation** - Todd See; **Southern ADSA Honor Award** - Brinton Hopkins; **Vernon Young International Award for Amino Acid Research** - Sung Woo Kim

##### **BIOLOGICAL AND AGRICULTURAL ENGINEERING**

**PEI (Professional Engineering Institute) Professional Engineer of the Year Award** - Rodney Huffman

##### **BIOLOGY**

**CALS Outstanding Faculty Adviser Award** - Miriam Ferzli

##### **CROP SCIENCE**

**NC State Alumni Association Outstanding Teacher Award** - Michelle Schroeder-Moreno

##### **ENTOMOLOGY**

**Fellow, Entomological Society of America**-Charles Apperson; **Alumni Distinguished Undergraduate Professor** - Clyde Sorenson, Entomology; **Southern Region IPM Center Friends of IPM Future Leader Award** – Hannah Burrack

##### **FOOD, BIOPROCESSING AND NUTRITION SCIENCES**

**Fellow, Institute of Food Technologists**-David Green; **NC State Outstanding Teacher Award** - Keith Harris; **2011 William C. Haines Dairy Science Award**, Allen Foegeding

**HORTICULTURAL SCIENCE**

**Chet and Lucy Black 4-H Professional Development Scholarship** - Elizabeth Driscoll; **Ort Family Scholarship Award for Outstanding Cooperative Extension Personnel** - Wayne Buhler

**MICROBIOLOGY**

**Board of Governors Award for Excellence in Teaching Nomination** - Gerry Luginbuhl

**PLANT BIOLOGY**

**Arthur C. Neish Young Investigator Award** - Deyu Xie; **CNR-CALS Joint Award for Service to Environment and Society** - JoAnn M Burkholder; **NC State Outstanding Teaching Award** - Susan Carson; **American Society of Naturalists Young Investigator Award** - Marc Johnson

**PLANT PATHOLOGY**

**Academy of Outstanding Faculty Engaged in Extension** - Lane Tredway; **Alumni Outstanding Extension and Outreach Award**- Lane Tredway; **Outstanding Extension Service Award** - Lane Tredway

**POULTRY SCIENCE**

**Biology Scholars Program Research Residency** - Jacquelyn B. Hoffman, Poultry Science;

**SOCIOLOGY AND ANTHROPOLOGY**

**Southern Sociological Society Roll of Honor Award** – Ron Wimberley;  
**Rural Sociological Society 2010 Distinguished Rural Sociologist Award** – Ron Wimberley

**SOIL SCIENCE**

**Distinguished Service Award** - Deanna Osmond

**NC COOPERATIVE EXTENSION AWARDS**

**Academy of Outstanding Faculty Engaged in Extension** - Michael Frinsko, area specialized aquaculture agent, Jones County; **Ada B. Dalla Pozza Professional Development Award** – Jeannie Misenhiemer Leonard, Davidson County; **Achievement in Service** - Roshunda Blount, Anson County; **Billy and Wilma Caldwell Extension Leadership Award** - Ann Darkow, Beaufort County; **Dr. Russell C. King and Mrs. Connie H. King Extension Program Teamwork Award for the Northeast Region of North Carolina** - Ann Darkow, Beaufort County; **Carol M. Birckhead Award for Outstanding County Extension Director** - Lori Stiller Ivey, Stanly County; **Carolyn Stanley Barnes and George Edward Barnes 4-H Graduate Education Scholarship** - Bill Stone, Lee County; **Charles M. Brickhouse Development Award** - Diana Rashash, Onslow County; **Clara Y. Motley 4-H and Family and Consumer Sciences Award** - Stephanie Mae Parker, Gates County; **Dean Don Felker Financial Management Award** - Susan Chase, EFNEP Extension associate, Northeast District (Pitt County); **Early Career Award** - Kelly R Canupp, Craven County; Susan Chase, EFNEP Extension associate, Northeast District (Pitt County); **Distinguished Service Award, National Association of County Agricultural Agents** - Frank C. Winslow, Tyrrell County; **District 8 Hunter Education Instructor of the Year** - Chad James Ray, McDowell County; **Dr. Michael A. Davis Family 4-H Award** - B. Wallace Simmons, Wayne County; **Dr. Nadine Tope Family and Consumer Sciences Program Development Award** - Stephanie Mae Parker, Gates County; Leigh Taylor Allen Guth, Lincoln County; **Edgar J. and Ethel B. Boone Adult Education Award** - Leigh Taylor Allen Guth, Lincoln County; **Dr. Sandra Zaslow FCS Professional Development Award** - Stephanie Mae Parker, Gates County; **Dr. R. Marshall and Mrs. Jan Stewart 4-H Leadership Award** - Louise Hinsley, Beaufort County; **Dalton R. Proctor Award** - Louise Hinsley, Beaufort County; **Lathan F. Smith, Jr. Award of Excellence in 4-H** - Louise Hinsley, Beaufort County; **Early Childhood Care Training Award** - Debbie L Cox, Caldwell County; Margo J Mosley, Alexander County; **NC State Grange Search for Excellence Outstanding Program Initiative Award** - Debbie Cox, Caldwell County; Margo Mosley, Alexander County; **Edgar J. and Ethel B. Boone Adult Education Award** - Spring Williams, Burke County; **Food Safety Award**- Susan Chase, EFNEP Extension associate, Northeast District (Pitt County); Ann Darkow, Beaufort County; **George and Virginia Hyatt Extension Scholarship Award** - Michael Frinsko, area specialized aquaculture agent, Jones County; Phyllis Smith, Chatham County; **Ila McIlwean White Family and Consumer Science Program Endowment Award** - Susan Stanford Chase, EFNEP Extension associate, Northeast District (Pitt County); **Lois G. Britt Outstanding Extension Agent Award** - Karen Neill, Guilford County; **Ort Family Scholarship Award for Outstanding Cooperative Extension Personnel** - Reba M. Green-Holley, Gates County; Louise Hinsley, Beaufort County; **Outstanding Extension Service Award** - Michael Frinsko, area specialized aquaculture agent, Jones County; **NC State Grange**

**Search for Excellence Community and Resource Development and Natural Resources** - Martha Mobley, Franklin County; **Team Award** - Susan Chase, EFNEP Extension associate, Northeast District, (Pitt County); Ann Darkow, Beaufort County; Louise Hinsley, Beaufort County; **Victoria Jean Cope NC 4-H Professional Development Award** - Vanessa Greeson Spiron, Wilson County; **Visionary Leadership Award** - Debbie Glauer Bost, Cabarrus County

### **Students: Honors, measures of quality and student activities**

In the Fall 2010 Semester, there were 335 students enrolled in the Agricultural Institute, 4,658 students in the undergraduate program and 968 students in the graduate program. There were 782 beginning freshmen and 251 new transfer students enrolled in the undergraduate program, 245 new graduate students and 147 beginning and new transfer students in the Agricultural Institute. For incoming freshmen, the average SAT total was 1160, the average weighted high school GPA was 4.23, and 47% of students were in the top 10% of their high school graduating class. Measures of quality for incoming freshmen in the College were similar to those for the University. CALS incoming freshmen received 17 of the 59 Park Scholarships. Many incoming CALS freshman were invited and chose to participate in University honors and scholars programs. The College had 31 incoming University Honors students, 91 incoming University Scholars students and 15 incoming Jefferson Scholars. The College awarded \$786,000 in scholarships to more than 530 students during the 2010-2011 academic year. Forty student clubs and organizations were affiliated with the College, and 48 students served as CALS Ambassadors. The academic success and outstanding achievement of our students continues to bring accolades to the College. During the 2010-2011 academic year, Lauren Forbes, a Jefferson Scholar double majoring in Environmental Science and Political Science, was awarded the prestigious Thomas R. Pickering Undergraduate Foreign Affairs Fellowship for preparation to enter the U.S. Department of State Foreign Service. The College also served 369 students in the College's Honors Program, which requires a minimum GPA of 3.35. During the 2010-2011 academic year, 130 associate degrees were awarded to 81 Agricultural Institute graduates. In addition, 1,069 baccalaureate degrees were awarded to 1,024 students. Of these, 13% graduated cum laude, 11% graduated magna cum laude and 14% graduated summa cum laude. Of the graduates, 85 had participated in the College's Honors Program and completed their requirements. (Note: Graduation totals are preliminary pending the completion of graduation clearance for the May 2011 Commencement Exercises.) The College's Career Services office saw increases in the number of students that utilized services during 2010-2011: 5,532 students heard classroom announcements; 1,409 students participated in a career presentation in one of their classes; 723 students attended one-on-one counseling sessions; 5,019 students participated in an optional professional development workshops; 1,411 students attended Career Expo; 328 students were enrolled in a career course for credit; 269 industry representatives visited campus to share career advice and 5,137 new jobs and internships were posted on ePack. Improved technology initiatives included student and family e-newsletters, the launch of a new faculty webpage, increased Twitter and Facebook followers, an automated appointment scheduling system and a resume marathon to conduct virtual resume critiques for students. Fourteen corporate sponsors contributed to workshops, programs and job-shadowing opportunities for students. Last year's Master Minds job-search program was expanded and strengthened through relationships with industry professionals, who served as Success Coaches for student groups. The December 2010 career survey results for CALS degree recipients indicated that 24% were employed, 20% were headed to graduate/professional school, 35% were seeking employment and 21% marked "other" or "unsure" as their status. Freshman and sophomore retention rates were 90% and 81% respectively, while four-year and five-year graduation rates were 46% and 70% respectively, indicating that students in the College were successful in their studies and graduating on time.

### **Fund Raising: Private fund-raising successes**

The CALS Advancement Office raised \$21.1 million Gifts and New Commitments as of 4/30/11. This total is 38% ahead of last year and again leads the University in fund raising. In addition, we assisted in the implementation of the 5% Gift Fee with very little loss of donor support or funding. This fee is expected to generate \$300,000 to \$350,000 annually in new funds to support fund-raising activities for CALS; the total is \$254,000 from 10/11/10 to 4/31/2011. We also completed a reorganization of CALS College Advancement. Some of these changes included: hired a new CALS CA Business Officer (starts May 23 and will be paid from the Gift Fee); hired a new Administrative Support Associate/Building Liaison (started March 2011 and is paid from the Gift Fee); hired a new Administrative

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Support Associate/4-H Admin (started March 2011 and is paid from the Gift Fee); hired an FCS/ECA Executive Director (bi-weekly) who replaces Kay Saville and will be paid partially from the Gift Fee; hired a new FCS/ECA admin assistant (bi-weekly) (started November 2010 and is paid partially from the Gift Fee). David Hays retired effective April 2011. This position is being evaluated. Michael Martin, 4-H Executive Director, resigned effective April 2011. This position has been restructured and a search is underway. Beth Farrell resigned effective October 2010. This position has been eliminated, and the duties taken on by Kathy Kennel and Carl Piraneo. We hired a new Assistant Director of the CALS Alumni and Friends Society after a 2-year period during which this was a temporary position. The LaPaz project and company continue to make progress toward the successful completion of the research project and profitability. Our 30,000 shares of Albion Medical Holdings stock paid a \$15 dividend per share in May 2011, totaling over \$455,000. These funds will be used to pay down the BB&T LaPaz loan.

Our goals for next year include: a preliminary goal to raise a total of \$25 million in gifts and new commitments; continue to monitor the Gift Fee process and work with any donors concerned about the fee; monitor and report on use of the Gift Fee funding ensuring that it is being spent in accordance with the Chancellor's Gift Fee Policy; complete implementation of the CALS CA reorganization plan, including all necessary hires and staff changes. Our challenges for next year include: the economy continues to be a barrier to greater success in fund raising, a situation that will most likely continue for some time. This is especially true regarding land gifts; the loss of funding from Golden LEAF and the NCTTFC to the General Assembly could have a negative \$1 to \$2 million impact on our fund-raising efforts. Concerns over the State Budget and potential budget cuts continue to be an issue of concern relative to staffing and moral. Our relationship with University Advancement has and continues to be an issue of concern as there seems to be a mentality of suppressing the success of the College-based fund-raising entities as opposed to supporting our success.

Other successes include: developed and convened the initial meeting for the newly established CALS Advocacy Committee; Tailgate (1,225 attended (the largest single alumni event at NC State); external relations focused on the REACH product and the "Farmers are Hero's" billboard campaign; Campaign for the Clover has raised/pledged gifts totaling \$6,436,234 or 56% of its goal with three years remaining; Family and Consumer Sciences Foundation celebrated its centennial on May 25 with 800+ guests; CALS Research Foundation pending proposals under consideration include \$4.7 million (4 proposals) in support of AMPLIFY, \$2 million in support of CEFS and \$100,000 in support of the Sweet Potato Campaign.

### **Administration: Achievements and staff changes**

- Sheri Schwab was appointed Associate Director and Director of County Operations in Cooperative Extension.
- Tom Melton was appointed Associate Director of Cooperative Extension and State Program Leader ANR/CRD.
- Julia Kornegay stepped down as department head of Horticultural Science and is serving as director of graduate programs in the department. John Dole was appointed interim head of Horticultural Science.
- Sastry Pantula stepped down as department head in Statistics. Peter Bloomfield is serving as interim department head in Statistics.
- Joe Zublena was permanently appointed Assistant Vice Chancellor for Extension and Engagement and Associate Dean and Director of Cooperative Extension.
- Joy Martin was permanently appointed Assistant Dean for Finance and Business.
- Donn Ward retired as department head in Food Science. Chris Daubert was appointed interim head of the department.
- Eric Miller was permanently appointed department head of Microbiology.
- Michael Waggoner was appointed interim head of Crop Science in addition to his role as department head of Soil Science.

### **Recommendations and concerns for the future**

Maintaining the quality of our programs in the face of dwindling financial resources continues to be our greatest concern. Simply maintaining programs in the present economic climate is a challenge, yet we must look beyond the present situation. Many of our labs and classrooms, particularly in buildings such as Williams Hall and Gardner Hall, are badly in need of renovation. We must provide top-notch facilities if we hope to keep and attract the best faculty and students. At the same time, the 18 agricultural research stations to which our faculty have access across the state and our field laboratories are a valuable research, teaching and extension resource, but we must be able to hire personnel to operate and maintain these facilities. Where possible, we have and will continue to look for partnerships that will help us maintain facilities. For example, several equipment manufacturers have provided tractors and other equipment for use at the Lake Wheeler Road Field Laboratory.

Also of concern is the impact the university plan for strategic alignment may have on our programs. We are in the process of developing a plan to centralize college business services such as human resources, payroll, and grants and contracts administration activities. While we are hopeful that combining college business services will produce efficiencies and savings, we are also cognizant that transitions of this sort almost always involve some bumps in the road and can represent a difficult adjustment for some employees.

We are also looking at models that might be appropriate in aiding us in reorganizing our life sciences programs. The utmost care should be exercised in reorganizing life sciences programs. While there may be redundancies across colleges or within our college in life sciences, these programs are among our strongest and are at the core of our teaching, research and extension mission. We feel, therefore, that it is important to study any reorganization plan carefully and allow as much input about the plan as possible before implementation.

Finally, a word about our agricultural programs. While the fiscal situation in which we find ourselves is pressing, it is important to take a long view as we make decisions that will impact the future of our college and the university. That view should include agricultural programs. Admittedly, a small percentage of our state's and nation's population is involved in agriculture, yet agriculture remains an important part of North Carolina's economy, and our programs support North Carolina agriculture. At the same time, we see agricultural programs, particularly research, becoming more important in coming years as the world's population grows and it becomes more difficult to feed that population. Agricultural programs must be part of our college's and North Carolina State University's future.

## Examples that illustrate the strategic goals in the strategic plan

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

An outreach service program created in 2008 by Dr. Suzie Goodell, assistant professor of food, bioprocessing and nutrition sciences, is providing students with an unusual learning experience and helping the community. Dr. Goodell established a collaborative agreement with North Carolina Head Start to implement a nutrition/literacy project that promotes good nutrition and food habits as well as literacy development for Head Start children and families in Wake and Chatham counties. The result is a program called Nutrition NUTS (Nutrition Understanding Through Service). Since the spring of 2009, Nutrition NUTS has delivered nutrition education through two initiatives. Through an effort called PEANUTS Read, NC State students make weekly visits to Head Start programs in targeted counties to read stories with food and nutrition themes to children. A second effort, called WALNUTS, involves information boards (interactive boards) bearing nutrition guidance and information. The boards are developed by students and placed in Head Start sites, where NCSU students provide parents with nutrition education and information.

NC State students began developing educational materials for Nutrition NUTS and designing lesson plans for PEANUTS Read and WALNUTS in Fall 2008. Students have designed eight series of curricula for the program, focusing on topics such as dental health, gardening, fruit and vegetable exposure, heart healthy diets and osteoporosis prevention. A team of NC State students is now working with students at Eastern Carolina University to develop a 15-week, 75-lesson inquiry-based curriculum focusing on healthy eating habits and fruit and vegetable exposure.

Over the past 3½ years, more than 100 NC State students have volunteered to serve their community. More than 1,000 preschool children and their families have received nutrition education as a result of this student outreach. Currently, Nutrition NUTS is providing nutrition education to four Head Start centers in Wake and Chatham counties. In the past, the program has also served Durham and Orange counties. Dr. Goodell plans to partner with faculty, staff and students at Elon University, University of North Carolina-Greensboro and Eastern Carolina University to expand the program to more North Carolina counties.

### **2. Enhance scholarship and research by investing in faculty infrastructure.**

A major renovation of the North Carolina State University Phytotron, a collection of climate-controlled chambers that allows scientists to control the conditions under which plants are grown, is underway. The work is being funded with a \$1.79 million National Science Foundation grant. This facility, which opened in 1968, is an indispensable research tool. The Phytotron contains 57 growth chambers ranging in size from 4 feet by 3 feet to 8 feet by 12 feet and five climate-controlled roof-top greenhouses. While the majority of the research done in the Phytotron involves plants, the facility has also been used by zoologists and entomologists. Renovation of this facility to bring it up to state-of-the-art standards will support the research of faculty members throughout the College of Agriculture and Life Sciences.

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

The Plants for Human Health Institute (PHHI) consists of research and extension programs that create a dynamic presence on the NC Research Campus at Kannapolis. Research on fruits and vegetables will enhance the health-protective value of food crops and has the potential to increase the economic impact of North Carolina agriculture. NC MarketReady, the NC Cooperative Extension outreach of the institute, works with PHHI faculty and Extension agents statewide to deliver educational resources that enrich the lives and economy of North Carolinians. Through the Plants for Human Health Institute, the College of Agriculture and Life Sciences supports faculty from the departments of horticultural science; food, bioprocessing and nutrition sciences; plant biology; and agricultural and resource economics. This transdisciplinary interaction strengthens the efforts of individual faculty.

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

The College of Agriculture and Life Sciences Diversity Council brings together faculty and staff from across the College to serve as a catalyst to foster inclusiveness within CALS. The council advises as well as assists in planning strategies to recruit and retain outstanding faculty, staff and students from historically underrepresented groups who have the skills, abilities, ideas and insights to make significant contributions to the college, our communities and society as a whole. The Diversity Council also advises and makes recommendations on strategies that promote an environment within CALS that is more conducive to historically underrepresented groups' development, productivity and success. Please see the Diversity: Initiatives and Progress section of the Annual Report to the Chancellor for more on council activities.

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

A company called Empire Foods announced in September 2010 that it planned to lease a 35,000-square-foot production facility to be built by Halifax County at the new Halifax Corporate Park and invest \$2.5 million in the plant over the next five years. At the plant, Empire Foods plans to use technology developed in the College of Agriculture and Life Sciences and licensed from NC State University to process fruits and vegetables. The technology licensed from NC State produces foods that are more shelf-stable. The products do not require refrigeration, but maintain the flavor, color and nutrients of fresh food. The company plans to purchase fruits and vegetables from local and regional farmers and will initially use the technology to supply the military and restaurant markets. Empire Foods anticipates creating 200 jobs in Halifax County. The average annual wage for the new jobs will be \$28,418 plus benefits, which is higher than the Halifax County average of \$25,532. The same technology is being used at a plant in Snow Hill, North Carolina to process sweet potatoes.

- end -