Changes in the Service Environment

Unfortunately, the economic environment has not changed dramatically over the 2009-2010 year. While the economy has emerged from recession and there are signs of improvement, the College experienced a difficult and uncertain budget in 2009-2010. The Academic Programs budget was reduced by $1,203,000 (5.09%), the NC Agricultural Research Service budget by $6,197,320 (10%) and the NC Cooperative Extension Service budget by $4,625,910 (10%). The College was forced to eliminate 43 filled positions by reduction in force, while few positions that were voluntarily vacated were filled. In an effort to deal with this difficult budgetary environment, Cooperative Extension implemented a Voluntary Early Retirement Authorization (VERA) for federal annuitants. As a result, four of six District Extension Directors chose early retirement, along with 28 additional Cooperative Extension employees. Combined with other retirements, Extension lost 80 employees to retirement. As a result, many county Extension centers are under-staffed, and while Extension has begun to fill some vacancies, the organization must deal with considerable loss of institutional knowledge and memory and with a workforce that will have substantially less experience.

While it is much too soon to tell, the oil spill in the Gulf of Mexico could impact College programs. Already, we have seen calls for more emphasis on efforts to develop renewable energy sources. An increased emphasis on renewable energy could mean we will need to provide additional resources for our biofuels programs.

We have seen increasing consumer interest in local foods coupled with interest in smaller farms that typically cater to niche and local markets. Programs such as the Center for Environmental Farming Systems are addressing this change in the agricultural sector. At the same time, there appears to be increasing consumer interest in more healthy diets, and we are addressing this with the Plants for Human Health Institute on the NC Research Campus in Kannapolis, where we are studying foods and components of foods that promote human health.

Finally, we have seen enrollment increasing in our Biology, Genetics and Biochemistry programs, and we may need to adjust our academic programs appropriately to meet an increased interest in these disciplines.

Compact Plan: Major initiatives

Through innovative and far-reaching programs of research, academics and extension, the College of Agriculture and Life Sciences aims to:

- Provide students — both on campus and beyond — with the knowledge and skills they need to succeed in a rapidly changing world;
- Produce well-trained, socially responsible graduates who are ready to contribute to the state of North Carolina and make a difference in their communities;
- Foster economic vitality by generating and applying science and technology that support robust agricultural and life sciences industries;
- Conserve and improve the state’s natural resources and environment;
- Improve the health, well-being and quality of life of North Carolina’s individuals and communities.

Diversity: Initiatives and Progress

The College is committed to building a diverse and inclusive community that includes all groups the College serves. Several critical building blocks 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 has sponsored the Opening Doors program for the past five years, reaching a total of 267 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, held three times a year, include a three-day retreat.

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 created in 2008 and has met monthly since its inception to develop and implement strategies to address priority need areas. For example, enrollment of male students from under-represented groups lags behind that of their female counterparts by more than 50% in some cases. The Creating Awareness of Agriculture and Life Sciences Disciplines, Degree Programs and Discoveries Project (CAALS 3D) was developed in response to this need. The CAALS 3D project serves male N.C. School of Science and Math (NCSSM) students from under-represented groups to increase their awareness and interest in academic programs, research and career fields within the food, agricultural, environmental and life sciences. Twenty-four male NCSSM students worked with nine CALS faculty in their labs for one week during the summer of 2009.

Also in 2009, CALS initiated the Preparing for the Agriculture and Life Sciences outreach program for limited-resource, first-generation middle school students. The literature is clear that limited-resource, first-generation students need recruitment programs that reach them early in the pipeline to college. Through this program, 24 rising eighth graders from Eastern North Carolina were provided with information on: 1) academic majors and career opportunities within the food, agriculture and life science disciplines; 2) what they need to do now and in high school in order to be competitive for admission to NCSU; as well as 3) financial aid and scholarship availability and requirements.

In terms of recruitment of graduate students from under-represented groups, CALS participates in visitation programs for under-represented undergraduate students with the NCSU Graduate School and Office of Diversity and Inclusion. Odell Isaacs, a Xavier University student who participated in the CHAMPS Visitation Program, is participating in the 10-week Synthetic Biology summer research program beginning May 30, 2010. CALS also created and held its own visitation program called Explore in 2009 to make students more aware of agricultural science disciplines. Michelle Becton, an NC Central University student who participated in Explore, is participating in an eight-week summer research experience in genetic pest management beginning June 2, 2010.

Additionally, in May 2010, CALS began the Dean’s Graduate Research Assistantship to recruit new graduate students from under-represented groups. Retention of under-represented students is also a priority. The College continues to teach sections of the USC 110D course for freshmen from under-represented 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.

The College also 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). The College sponsors personal, academic and professional development activities for MANRRS and MAPS students throughout the year. Biological Sciences faculty offer two retention programs: Reaching Incoming Student Enrichment (RISE) and Howard Hughes Research Scholars (HHRS). The RISE program provided a six-week introduction to scientific research for 11 incoming first-year students, including seven women, during the summer of 2009. Minority enrollment in the RISE program has steadily increased each year of the grant from 13% in 2007 to 18% in 2008 to 36% in 2009. The two-year HHRS Program provides outstanding NCSU sophomore, junior and senior undergraduate students with experience conducting
scientific research in an NCSU laboratory during the academic year and in the summer. Thirteen students participated in the 2009-10 program; over 50% were female and 46% ethnic minorities, up from 11% in cohort 1. Finally, the College, via the NC Cooperative Extension Service, continues to lead the national Change Agents States for Diversity (CAS) project, with a total of 17 states and 20 institutions involved. Over the past year, CAS continued 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 2009-2010 academic year. At the undergraduate level, college-level concentrations in Ecology, Economic Policy and Environmental Soil Science under the BS in Environmental Sciences were dropped in anticipation of pending revisions to the degree program. A new Genetics degree program was approved and will be effective for the Fall 2010 Semester. An undergraduate degree in Soil and Land Development is still pending approval at the system level from 2008-2009. In addition, a distance education version of the BS in Agricultural Sciences has been sent forward for system approval. Two new concentrations were approved under existing degree programs. The new concentrations are an Applied Nutrition concentration under the BS in Nutrition Science degree program and a Youth Leadership Development concentration under the BS in Extension Education degree program. Curriculum changes at the graduate level included the discontinuation of the Master of Science in Family and Consumer Sciences. Two new undergraduate certificate programs were approved. One of these, Animal Nutrition, will be offered both on-campus and through the Distance Education program. The second, General Horticulture, will be offered through the Distance Education program only. At the graduate level, three current non-thesis master’s programs — the Master of Agricultural Education, Master of Extension Education and Master of Food Science programs — were approved to operate as Option B programs, allowing for the operation of the programs with a single adviser and eliminating the final oral exam requirement. One new distance education program, the Master of Animal Science, was approved at the graduate level, and a new dual degree program between NC State and Universidade Federal de Viscosa was approved. Seven new certificate programs were also approved. They are Environmental Assessment, Youth Development Leadership, Volunteer Management and Administration, Administration and Leadership-Family and Youth Programs, Family Life and Parent Education, Gerontology and Family Life Coaching. Three new concentrations in Plant Pathology were approved: Translation Plant Pathology, Evolutionary Ecology and Population Biology and Host-Microbe Interactions. There were minor curricula revisions to 18 undergraduate degree programs, including two in the Agricultural Institute. Twenty-five undergraduate courses and 23 graduate courses were approved as new courses; 24 undergraduate courses and 18 graduate courses were revised; and seven undergraduate courses and six graduate courses were dropped. Undergraduate and graduate program review and assessment continued to be a point of emphasis. The departments of Animal Science, Entomology and Horticultural Science underwent comprehensive reviews, and the graduate programs in Economics, Genetics and Immunology were 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 and CVM as well as 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 and Duke University. The NCSU BIO-NMR facility became operational in the Department of Molecular and Structural Biochemistry; genomic sciences service functions were consolidated in the GSL on Centennial Campus; the new swine research facility was occupied with animals; development continued at two aquaculture research and demonstration sites, and environmental chambers are being built in the animal systems air quality research building.

NCARS personnel, supported by federal, state, grant and/or gift funding, include 380 research scientists; 610 graduate students, researchers, research assistants and postdoctoral students; and 545 technicians and support staff. Many have joint appointments with Academic Programs and/or Extension. The faculty and support personnel conduct basic and applied research involving 483 federal, state and regional projects supporting over 70 commodities, related agribusinesses and life sciences industries. CALS scientists submitted 1,098 funding proposals, requesting a total of $257,638,262; 737 proposals were awarded, totaling $66,861,260. Research expenditures totaled $125,147,972. NCARS development activities generated an estimated $2.66 million in endowments and other support for college research. Faculty filed 29 invention disclosures; 12 new plant varieties were released; 21 U.S. patents were issued and 55 licenses dealing with NCARS disclosures were executed.

Representative achievements of NCARS research activities include the following.

**Plants and human health.** With support from state appropriations, a $2 million gift from David Murdock of Dole Foods, $1 million from the NC Distinguished Professors Endowment Trust Fund, a $1 million gift from local businessman Ben Jones, federal and private competitive grants, the Plants for Human Health Institute aims to enhance the nutritional value of fruits and vegetables and related compounds to improve human health and prevent disease. Located at the NC Research Campus, the PHHI includes 31 NC State researchers and support staff plus a seven-member outreach team with NC MarketReady. The PHHI building is occupied, including several partners, and over $12 million worth of scientific equipment and instrumentation have been installed. The PHHI, collaborating with the David H. Murdock Research Institute and a nationwide consortium, is sequencing the blueberry genome, and a draft 70x coverage sequence has been completed. Contact: Mary Ann Lila, Steve Lommel

**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.** TAK1 kinase signaling has been discovered to control 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

**Ecology and environment.** NCSU research to assess and mitigate ecological impacts of invasive species led to new management and containment strategies for controlling the invasive white perch and protecting the
threatened Carolina madtom. **Hydrilla acreage in Lake Gaston decreased from 3,000 acres to 1,500 acres** with assistance from the aquatic/non-cropland weed program, resulting in a **savings of $1 million per year** for this one water body and demonstrating that with new control approaches, hydriilla tuber banks may be reduced 56 to 67% in a year. **Wetland creation and restoration techniques** were developed and evaluated for native vegetation adapted to each elevation and salinity zone required to support intertidal marshes. Restored wetlands provide new fish and wildlife habitats and perform many of the functions of natural wetlands. Contacts: Derek Aday, Rob Richardson, Stephen Broome

**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. Five new plant variety disclosures were made, two patents were issued, five patent applications were filed and three production and marketing licenses were negotiated. 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. The **Horticulture Substrates Laboratory evaluates mulch, soil amendment and potting soil products** for technical standards, wetability and toxicity to determine compliance with industry certification standards. Major retailers like Home Depot and Lowe’s require certification for many of these products sold in their stores. In 2009, over 100 million bags of these products carried the certification mark. Contact: Tom Ranney, Dennis Werner, William Fonteno

**Broilers and incubation temperature.** Intermittent heating of incubating chicken eggs from days 7 to 16 produced birds that had lower metabolic rates, improved heat loss and decreased stress at market age. Intermittent heating from days 16 to 18 produced birds that had 1% more breast muscle and less abdominal fat at market age. In both approaches, changes in incubation conditions did not adversely affect hatchability and quality of the hatched chicks. Together, these **developments could represent a $45 million annual benefit to the poultry industry.** Contact: John Brake

**Mitigating nematode parasitism of plants.** Using the power of genomics, fundamental scientific discoveries have been made that will lead to **strategies to prevent nematodes from infesting plants by disrupting vulnerable points for parasitism, ultimately reducing the detrimental economic, environmental and societal impacts of nematode diseases.** In 2009, technology from this research was licensed to a major U.S. agricultural company, which also entered into a collaborative research agreement with the PI to develop technology applications to enhance agricultural production. Contact: Eric Davis

**Reducing pesticide impact in horticultural food crops.** “Chemigation” through drip irrigation systems eliminates spray drift and accumulation of residues on plant surfaces and reduces exposure to workers and beneficial insects. Field research with tomatoes, peppers and cucumbers indicates this approach yields equivalent or improved insect control, a 61% reduction in pesticide use and 26% savings in pesticide costs. Since most vegetable growers use drip irrigation, growers may immediately implement a management strategy that represents an economic benefit and reduced risk to farm workers and the environment. **Researchers have developed a new natural herbicide** that is exceptionally safe, can be certified for organic systems, is broad spectrum, is active at levels similar to current commercial herbicides and is unique in that it kills plants in less than 30 minutes while most other materials take a week or more. The technology has been submitted for a U.S. patent and is being evaluated by major agricultural companies. Contact: James Walgenbach, Michael Roe, George Kennedy

**Reducing energy needs and costs of curing tobacco.** In an ongoing effort to reduce tobacco curing costs, engineers examined variable frequency drive controls for fans and an automated wood chip fuel system for the heat source in flue-cured tobacco barns. The variable frequency control system installed on barns reduced electricity needs for curing by up to 40%, with no effect on curing time or leaf quality. The wood-fueled curing system coupled with variable frequency fan controls can reduce costs of curing tobacco by as much as 60%.
These cost reductions help keep tobacco growers competitive and profitable. Contact: Mike Boyette, Grant Ellington

Alternative marketing arrangements (AMAs) benefit crop farmers. AMAs help farmers manage risks, especially price risk, and reduce farmers’ transaction costs by providing adequate market access. Even though AMAs are associated with marketing of 36% of U.S. agricultural products (ranging from a variety of crops to livestock), their use remains controversial, especially in the livestock sector, where supply control is a concern. AMAs benefit corn growers by $290 million; soybean producers by $127 million and wheat producers by $40 million. With a clear understanding of these benefits, policy makers should be able to make more informed decisions that will benefit farmers and rural economies. Contact: Xiaoyong Zheng

Extension: Initiatives and public service activities

In calendar year 2009 NC Cooperative Extension’s educational programs reached 6,576,653 citizens. Extension conducted 18,149 programs that were eligible for non-degree credits, and more than 56,000 volunteers contributed 871,804 hours of time valued at $17.1 million. Volunteers extend Extension’s educational outreach to North Carolina citizens. In 2009 volunteers delivered programs to 893,265 citizens through instructional contact. Many people depend on certification for their livelihood, and Cooperative Extension delivered programs to 31,087 people, with 15,746 becoming recertified and 5,196 certified for the first time in programs ranging from pesticide applicator to hospitality. Participants put the total value of these programs at nearly $1 billion.

The North Carolina Cooperative Extension Long Range Plan was revised during 2009-2010. The original plan had 20 objectives. After eliminating and consolidating existing objectives, a number of objectives were revised to fit the outcomes and impact information collected. All of the 15 objectives align with one or more of the five NC State priorities. A continued effort to refine objectives will result in more focused, cost effective and impactful programs in the future.

Fueling economic development — Extension’s MarketReady program helps agricultural producers remain competitive. NC MarketReady, based at the NC Research Campus in Kannapolis, enhances farmers’ skills in business, marketing and other areas so they can compete in good financial times and bad. In 2009, MarketReady’s NC Value-Added Cost-Share (VACS) program awarded nine producers $144,500 from the NC Tobacco Trust Fund Commission to help producers prepare and submit competitive applications and enterprise feasibility assessments for USDA’s Value-Added Producer Grants (VAPG). In 2010, VACS will award $425,000 to provide assistance to NC producers through its spring equipment cost share and its summer VAPG grant writing and agricultural enterprise feasibility assessment cost share cycles. MarketReady also created the Business Development Files to guide growers as they assess agricultural operation feasibility. These files help growers start new agricultural businesses and maintain and optimize existing operations during these financially tough times.

Fueling economic development — Extension’s programs propel people toward financial success. Extension agents delivered financial management workshops to help struggling families. Here are a few examples of the success that resulted in 2009.

- Extension worked with Senior Health Insurance Information Program (SHIIP) trained volunteers to reach 1,934 Medicare beneficiaries and enroll them in Medicare Part D prescription programs. As a result, seniors saved a total of $2,022,000, with individual savings ranging from $300 to $23,000 in prescription drug costs.
- The Buy 10% Local Food Campaign encourages North Carolinians and North Carolina institutions to spend 10% of food dollars on local foods. If this was done, approximately $3.5 billion would be available in the local economy every year, and some of this money would flow back to farmers and food businesses.
• In Durham County, one couple reported that by following Extension advice, they were able to launch a home-based vegan food business with a three-year grocery store contract, valued at $24,960 per year.

• In Edgecombe County, an Extension client learned how to refinance his home and save $5,000 in closing costs and lower his interest rate from 6% to 4.5%.

**Driving innovation in energy and the environment — Extension builds a biobased economy in northeast NC.** With the help of Cooperative Extension and the College of Agriculture and Life Sciences, community leaders are laying the groundwork for a biobased economy to create jobs and businesses in the northeastern part of the state, a largely rural area that has seen significant job losses in recent years. A biobased economy relies on the production of crops for processing into a range of products, from biofuels to perfume, medicines and nutraceuticals. Central to the effort is the Vernon James Research and Extension Center in Plymouth. The first step will be to develop a pilot facility in the region where companies can test the extraction process for their products. This will be the third U.S. facility of its kind. The College also has a grant to develop a B-cert program, which will certify farmers to produce biotechnology crops. In addition, we see the Vernon James Center becoming a commercialization campus for new biobased products. CALS educators are also participating in an innovative agriscience high school program designed to create a prepared workforce for the biobased economy. Students who complete the program will earn both their high school diplomas and two-year associate’s degrees simultaneously.

**Producing leaders for the state, nation and world — Agricultural Leadership Development Program.**

This two-year program ended in 2009 with 30 graduates. The program is conducted in partnership with the Personal and Organizational Development unit and the Foundations Office, with support from the Tobacco Trust Fund, Golden LEAF Foundation, commodity and farm organizations and related agribusinesses. The program included 50 days of training, including a legislative study tour, local and domestic study tours and a study tour to Brazil. Upon completion, participants are prepared to assume leadership roles addressing issues affecting agriculture, bridging gaps between rural and urban interests and fostering unity among agricultural interests.

**Producing leaders for the state, nation and world — North Carolina Operation Purple Camp.** Working with the National Military Families Association, the 4-H Youth Development and Family and Consumer Sciences Department conducts Operation Purple Camp throughout the summer for children with parents who are in the military and who have been, are currently or will be deployed. Free week-long camps are provided with the generous support of the Sierra Club and the Sierra Club Foundation. The goal is to give military children tools to help deal with the stresses that result from a parent’s deployment through a memorable camp experience. At Swannanoa 4-H Camp, youth participate in a blend of traditional camp activities and high adventure activities. At the Eastern 4-H Center, on the shores of Albemarle Sound, youth enjoy canoeing, kayaking, target sports, rock climbing, ecology, leadership development, swimming and crafts. North Carolina has 103,118 youth of military parents. In 2009, our total military youth programming reached over 83,000 youth and adults.

**Improving health and well-being — Extension programs help families during tough economic times.** To help families cope with personal and financial crises, Extension developed a fact sheet series, podcasts and website called Take Control. Topics range from saving money on home heating and cooling to preparing for a job search and from managing family conflict to getting the best deal on a car. Containing 26 fact sheets in English and five in Spanish, the series resulted in statewide TV, newspaper and Internet coverage. Take Control materials were also part of the Managing in Tough Times network on eXtension. Launched in July 2009, the agent-targeted network has been well-received, with more than 11,000 searches or browses. In a related effort, Extension developed curricula to help consumers understand reverse mortgages and take full advantage of federal credit card legislation that went into effect in February. A third curriculum on personal savings is in the works. The materials on credit card legislation have been used with the news media, in workshops and in civic group presentations.
Faculty: Honors, Awards and Recognition (listed by department/unit)

4-H YOUTH DEVELOPMENT AND FAMILY AND CONSUMER SCIENCES: Communicator Award (Promotional Piece, Team) - Harriett C. Edwards and Scott J. Enroughty; Early Career Award - Kelly R. Canupp; Natural Resources Environmental Stewardship 4-H Team Award - Melissa J. Staeheburger; Career Achievement Distinguished Alumnae Award - P. Carolyn Dunn; N.C. Association of Extension 4-H Agents Achievement in Service Award - Benjamin Silliman. ACADMIC PROGRAMS: Faculty and Student Organization Resource Development Award - Marcy L. Bullock; Outstanding Contributions to Undergraduate Education - Barbara M. Kirby. AGRICULTURAL AND EXTENSION EDUCATION: Senior Fellow, American Associationn for Agricultural Education - James L. Flowers; Distinguished Teaching Award - Elizabeth B. Wilson. AGRICULTURAL AND RESOURCE ECONOMICS: George and Rhoda W. Kriz Faculty Study Leave Award - Daniel J. Phaneuf; Outstanding Teacher Award - John S. Russ; Outstanding Service Award - Arnold W. Oltmans; Teaching Fellow Award - Melissa L. Hendrickson. ANIMAL SCIENCE: Early Achievement Award in Research - Hsiao-Ching Liu; Academy of Outstanding Faculty Engaged in Extension – M. Todd See; Outstanding Extension Service Award – M. Todd See; George and Rhoda W. Kriz Faculty Study Leave Award - Jeannette A. Moore; Kenneth R. Keller Award - Stephanie L. Hansen; Extension Award - Eric Van Heugten. BIOLOGICAL AND AGRICULTURAL ENGINEERING: ASABE Fellow - Larry F. Stikeleather; Charles A. Black Communications Award - Richard W. Skaggs; Massey-Ferguson Educational Award - Richard W. Skaggs; George H. Blessis Outstanding Undergraduate Advisor Award - S. Andrew Hale; Outstanding Faculty Adviser Award – S. Andrew Hale; Hancock Soil and Water Engineering Award - Robert O. Evans; Faculty and Student Organization Resource Development Award - Thomas M. Losordo; Special Specialist Award - Sanjay Bikram Shah; Teaching Fellow Award - Gary T. Roberson. BIOLOGY: Lifetime Education Fellow - Miriam G Ferzli; IPM Excellence Award - John R. Godwin; Faculty Resource Development Award - Jeffrey F. Hinshaw; Outstanding Teacher Award - Lisa Parks; Service Award - James A. Rice. CENTER FOR INTEGRATED PEST MANAGEMENT: International IPM Excellence Award - Yulu Xia, Service to Agriculture Award - Ronald Edwin Stinner. COOPERATIVE EXTENSION: Outstanding Extension Service Award - N. Frederick Miller, Mark Dale Hucks; Distinguished Service Award - Edwin J. Jones, Sharon Thompson Farless, Ben Edwin Chase, Stanley Ray Holloway; Outstanding Sustainable Agriculture Agent - Martina Louise Price; Distinguished Service Award, National Association of County Agricultural Agents - Heather N. Lifsey, Nelson Brownlee; 2009 Professional of the Year - Jeannie Misenhiemer Leonard; Communications Awards: Audio Recording - Mark W. Blevins; Communications Award: Feature Story - Mark W. Blevins; Fellow, Sustainable Agriculture Research and Education - Mark W. Blevins; Search for Excellence in Remote Sensing and Precision Agriculture - Mark W. Blevins; Achievement Award - Keith B. Walters, Raymond Briggs Wood; Communications Awards Program - Raymond Briggs Wood; Search for Excellence in Livestock Production - Raymond Briggs Wood; N.C. Association of Extension 4-H Agents Achievement in Service Award - Erin E. Morgan; Communications Awards: Individual Newsletter and Publication - Charlotte D. Glen; Communications Awards: Learning Module/Notebook - Michelle Shooter, Richard Vernon Melton; Communications Awards: Learning Module/Notebook, Southern Region - Michelle Shooter, Richard Vernon Melton; Search for Excellence in Livestock Production, State Winner - Michelle Shooter, Richard Vernon Melton; Communications Awards: Newsletters - Sally E. McNeill; T.C. Blalock Young Agent Award - Laura K. Byrd; Community Partnership Award, State Winner - Sandra Best Head; Mary W. Wells Memorial Diversity Award - Sandra Best Head. CROP SCIENCE: Alexander Quarles Holladay Medal for Excellence - Alan C. York; Dr. William H. Daniel Founders’ Award - Grady L. Miller; Fellow, American Society of Agronomy - Joseph Paul Murphy; Fellow, Crop Science Society of America - Joseph Paul Murphy. ENTOMOLOGY: Alumni Outstanding Research Award - Coby J. Schal; Alumni Outstanding Extension and Outreach Award - David R Tarpy; Academy of Outstanding Faculty Engaged in Extension - David R Tarpy; Outstanding Extension Service Award – David
R. Tarpy; Outstanding Contributions to Entomology - Jack S. Bacheler. ENVIRONMENTAL AND MOLECULAR
TOXICOLOGY: Distinguished Service Award - W. Gregory Cope. FOOD, BIOPROCESSING AND NUTRITION SCIENCES: O.
Max Gardner Award - Todd R. Klaenhammer; Board of Governors Award for Excellence in Teaching
Nomination - Sarah Ash; Gertrude Cox Award for Innovative Excellence in Teaching and Learning with
Technology - Gabriel Keith Harris; Industrial Achievement Award - Kandiyan P. Sandeep, Josip Simunovic,
Kenneth R. Swartzel, Van-Den Truong; Alumni Distinguished Undergraduate Professor Award - Brian E.
Farkas. HORTICULTURAL SCIENCE: Educational Aids Blue Ribbon Award; Fellow, International Plant
Propagators Society; Medal for Honorary Service to the Society; Extension Materials Award: Website and
Bulletin - Ted E. Bilderback; Best Viticulture Paper - Sara E. Spayd; H. Marc Cathey Award for
Outstanding Scientific Research - Thomas G. Ranney; Medal for Meritorious Service - William C. Fonteno;
Alumni Outstanding Teacher Award - William C. Fonteno; Outstanding Teacher Award - William C.
Fonteno; Cross-Commodity Publication Award - Dennis J. Werner; Extension Materials Award: Book -
Jeanine M. Davis; Outstanding International Horticulturist - Lorenzo G. Wilson; Outstanding Researcher
Award - Joseph C. Neal; Porter Henegar Award - Joseph C. Neal; Paul Smeal Leadership and
Administration Award - Julia L. Kornegay. MICROBIOLOGY: Fellow, American Chemical Society - Michael C.
Flickinger; Outstanding Faculty Adviser Award - James W. Brown. PLANT BIOLOGY: Fellow, American Society
of Plant Biologists - Rebecca S. Boston; Arthur C. Neish Young Investigator Award - Deyu Xie. PLANT
PATHOLOGY: Dow Agrosciences Award for Excellence in Research - Barbara B. Shew; Alexopolos Prize -
Ignazio Carbone; APS Excellence in Teaching Award - David Shew; Fellow, American Phytopathology
Society - David S. Marshall; Fellow, Crop Science Society of America - David S. Marshall; Secretary of
Agriculture Honor Award - David S. Marshall; Outstanding Faculty Adviser Award - Robert I. Bruck,
Outstanding Extension Publication Award - Frank J. Louws; Sygenta Award - Ignazio Carbone. POULTRY
SCIENCE: William Neal Reynolds Professor - Peter R. Ferket; Outstanding Faculty Adviser Award - Jacquelyn
B. Hoffman. SOCIOLOGY AND ANTHROPOLOGY: William Neal Reynolds Professor - Michael D. Schulman, Sociology
and Anthropology. SOIL SCIENCE: Fellow, Soil Science Society of America - David L. Lindbo; Agronomic
Resident Education Award - John L. Havlin; Outstanding Graduate Instructor Award - Michael Vepraskas.
STATISTICS: Drexel Professor of Statistics - Leonard Stefanski.

Students: Honors, measures of quality and student activities

In the Fall 2009 semester, there were 351 students enrolled in the Agricultural Institute, 4,557 students in the
undergraduate program and 908 students in the graduate program. There were 810 beginning freshmen and 255
new transfer students enrolled in the undergraduate program, 248 new graduate students and 134 beginning and
new transfer students in the Agricultural Institute. For incoming freshmen, the average SAT total score 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 15 of the 55 Park Scholarships. Many incoming CALS freshman were invited and
chose to participate in the university honors and scholars programs. The College had 40 incoming University
Honors students, 94 incoming University Scholars students and 13 incoming Jefferson Scholars. The College
awarded $750,000 in scholarships to more than 530 students during the 2009-2010 academic year. Forty student
clubs and organizations were affiliated with the College, and 36 students served as CALS Ambassadors.

The academic success and outstanding achievement of our students continue to bring accolades to the College.
During the 2009-2010 academic year, Nathan Bihlmeyer, a Biochemistry student, was awarded the prestigious
Barry Goldwater Scholarship for the 2010-1011 academic year. In addition, four CALS graduate students
received NSF Graduate Research Fellowships. The College also added 130 students to its Honors Program, which
requires an invitation to rising juniors with a minimum GPA of 3.35. During the 2009-2010 academic year, 165 associate degrees were awarded to 116 Agricultural Institute graduates. In addition, 886 baccalaureate degrees were awarded to 820 students. Of these, 15% graduated cum laude, 16% graduated magna cum laude and 14% graduated summa cum laude. Of the graduates, 101 participated in the College’s Honors Program and completed program requirements. (Note: Graduation totals are preliminary pending the completion of graduation clearance for the May 2010 Commencement Exercises.)

The College’s Career Services office saw increases in the number of students that utilized services during 2009-2010: 5,731 students heard classroom announcements; 1,714 students participated in a career presentation in one of their classes; 875 students were reached through Minute Clinics; 897 students attended one-on-one counseling sessions; 2,889 students participated in a Career Services optional professional development workshop; 1,360 students attended Career Expo; 316 students were enrolled in an ALS career course for credit; 394 industry representatives visited campus to share career advice; and 2,747 new jobs and internships were posted on ePack. New multi-media connections included student and family e-newsletters, on-line disabilities module, Twitter (calscareer), Pack Parent Webinar (to be presented at the national meeting) and an automated scheduler. Career Services had 18 corporate sponsors. With hiring down nationally, Career Services offered new programs, including MasterMind Job Search Groups and Externships. The 2008-2009 career survey for CALS bachelor degree recipients indicated that within six months of graduation, 45% of graduates were employed, 44% were pursuing higher education, 6% were seeking employment and 5% marked “other” as their status. Freshman and sophomore retention rates were 90% and 86%, respectively, while four-year and five-year graduation rates were 47% and 69%, respectively, indicating that students were successful in their studies and graduating on time.

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

A number of departmental endowments were created by faculty and friends of the College, including the Peppe Scholarship Endowment in Food, Bioprocessing and Nutrition Sciences; Crumpler Scholarship Endowment; Mason Pharr Lecture Endowment and others. The 2010 U.S. Tobacco Forum was held June 10-11 in Research Triangle Park. The CALS Donor Recognition Gala is scheduled for Oct. 31 at McKimmon Center. Proposals in excess of $1.1 million were submitted by the Agricultural and Tobacco foundations to the Tobacco Trust Fund and Z. Smith Reynolds Foundation.

New gifts in support of the JC Raulston Arboretum and its master plan totaled more than $750,000. Sonia Murphy in the CALS Office of Planned Giving is hosting a series of workshops and house parties, including one scheduled at the Raulston Arboretum. Planned gifts thus far in 2010 total nearly $3 million. The NC SweetPotato Commission Campaign for Excellence, chaired by Kendall Hill and led by a committee that includes other members of the Agricultural Foundation and SweetPotato Commission boards, hosted an endowment signing in January, celebrating 10 new agreements in support of sweetpotato research and Extension work. These efforts have raised $710,000 toward a $1.3 million goal. The Campaign for the Counties continues to cultivate and generate gifts and in-kind support for Cooperative Extension Programs. As of March 31, 2010, the number of endowments and enhancement funds was 342. Gifts and pledges for the Cooperative Extension Foundations for the 2009 calendar year totaled $19,607,875. Included were tracts of land in Greene and Harnett counties.

During the first 18 months of the Campaign for the Clover, $3,227,000 has been gifted or pledged. More than $182,000 was raised by the 4-H Development Fund board of directors at the 4-H Lifetime Achievement Awards. The North Carolina Extension and Community Association Foundation was launched in April 2010 at a Joint Extension Foundations Board luncheon. A 30-member board of directors was introduced. The FFA Foundation
has also been successful in raising $950,000. One of the year’s greatest achievements was the creation of eight new regional agricultural education endowments that will support student-centered FFA activities.

**Administration: Achievements and staff changes**

Administrative changes

- Dr. David Smith was named associate dean for research and director of the North Carolina Agricultural Research Service.
- Dr. Jon Ort retired as assistant vice chancellor, associate dean and director of the North Carolina Cooperative Extension Service. Dr. Joe Zublena, Cooperative Extension associate director and director of county operations, is serving as interim director of the Cooperative Extension Service.
- Dr. Lisa Guion was named assistant dean for diversity, outreach and engagement. She had been serving in the position on an interim basis.
- Dr. Tom Melton, was named interim head of the Department of Crop Science.
- Dr. Todd See was named head of the Department of Animal Science. He had been serving in the position on an interim basis.
- Joy Martin was named interim assistant dean for finance and business.
- Sheri Schwab was named assistant dean for personnel.
- Dr. Lanny Hass was named interim director of Cooperative Extension’s Personal and Organizational Development unit.

**Recommendations and concerns for the future**

Funding continues to be our major concern and the single issue that most impacts College programs. Most of the challenges we face are directly or indirectly related to budget issues. We are working to incorporate transparency, flexibility and efficiency into our budget principles so that our departments may more easily deal with the difficult funding environment we continue to experience. At the same time, we must develop a new model to provide adequate funding for facilities such as the Genomics Sciences Laboratory, the phytotron, the Biological Resources Facility and our field laboratories and research stations. And if we expect our faculty to perform at their best, we must find funding to renovate laboratory space in Thomas Hall and Polk Hall.

We have seen increasing enrollment in our Biology, Genetics and Biochemistry programs, and we must ensure that the students in these programs have adequate resources. A new funding model for the Life Sciences that rewards productivity and increases incentives for securing funding may be necessary along with a reallocation of resources to reward productivity.

We have done an exemplary job in recent years of hiring new faculty, usually at the assistant professor level, and we must ensure that resources are available to help us keep these bright, young minds. Recommendations from a College work load task force that establish equitable expectations, funding and work load for teaching faculty may help in this regard.

The North Carolina Cooperative Extension Service faces its own challenges. With the retirement of the Extension director in the spring of 2010, we must identify new leadership. At the same time, many of Extension’s most experienced agents and administrators retired over the last several years. While we are beginning to fill vacant positions, many county offices remain under-staffed, and when we do fill positions, we must provide training in technical subject matter, program development, organizational policy and procedures and financial management.

Finally, we must continue to enhance our educational programs if we are to continue to compete for the best students. We must continue to provide programs such as VetPAC, a support program for students planning to
study veterinary medicine. We can also strengthen academic programs by expanding efforts to give our faculty and students a global perspective by providing opportunities for study abroad, personnel exchanges and grant support for international research.

**Examples of the five focus areas:**

1. **Producing leaders for the state, nation and the world**
   The eight North Carolina universities involved in the North Carolina Research Campus at Kannapolis are collaborating with industry partners to develop a transdisciplinary graduate training program called Kannapolis Scholars. This program will launch the careers of 20 scientists. These students, recruited from the eight campuses, will be immersed in a rich transdisciplinary training program that includes advanced instrumentation, mass spectrometry, laser imaging, high resolution NMR techniques, entrepreneurship and research protocols ranging from molecular-cellular models to plant and animal studies to human clinical experimentation. This program is being funded with a $1 million training grant from USDA-AFRI along with a $100,000 match from UNC General Administration. The program was developed and the grant secured by Dr. Jack Odle, William Neal Reynolds Professor of nutritional biochemistry.

2. **Creating educational innovation**
   First there was HealthPAC, the Health Professions Advising Center, created in 2006 in the College of Agriculture and Life Sciences to provide services to help students become candidates for health professional schools and careers. Now CALS is also the home of VetPAC, the Veterinary Professions Advising Center, a place for pre-veterinary students to receive centralized advising on the veterinary profession and the DVM application process.

   Keith Harris, assistant professor of Food, Bioprocessing and Nutriton Sciences, uses Moodle (an online learning management software) and other technologies to make FS 201, the required first course for food science majors, both an on-campus and a distance education class, providing opportunities to students in both physical and virtual space. For the online version of the course, Harris was named 2009 winner of the Gertrude Cox Award for Innovative Technology Enhanced Courses. The annually presented Cox Award was created to honor the “creative pedagogy” of N.C. State University’s faculty and technical staff and their work “in integrating new technologies into effective teaching strategies.”

3. **Improving health and well-being**
   Collaborating with researchers in the College of Physical and Mathematical Sciences, Dr. John Cavanagh, William Neal Reynolds Professor of Biochemistry, discovered a chemical compound that, when used in conjunction with conventional antibiotics, is effective in destroying biofilms produced by antibiotic-resistant strains of bacteria such as the *Staphylococcus* strain MRSA and *Acinetobacter*. The compound also re-sensitizes those bacteria to antibiotics. Infections from antibiotic-resistant bacteria such as MRSA are especially difficult to get rid of because the bacteria can attach to surfaces and then create biofilms, sticky layers of cells that act as a shield and prevent antibiotics from destroying the bacteria underneath. While a limited number of existing antibiotics may destroy part of the biofilm, enough bacteria survive to create a recurring infection as soon as antibiotic therapy stops, and over time the surviving bacteria build resistance to that antibiotic. The research team found that pre-treating bacteria with the compound increased penicillin effectiveness 128-fold.

4. **Fueling economic development**
   In Eastern North Carolina, economic development can be found in ponds where Malayan prawns have become a new cash crop, with the help and support of NC Cooperative Extension. Each fall, growers harvest these large, freshwater shrimp, raised in specially designed ponds. Prawns have become the
hottest trend in North Carolina aquaculture, thanks largely to the efforts of Mike Frinsko, Extension aquaculture agent based in Trenton. In 2004, North Carolina had a single prawn operation in Johnston County. Today, the state is home to nine prawn operations that produce 32,000 pounds of prawns on 38 acres annually, with a market value of more than $250,000. In fall 2009, a quick-freeze and storage facility was opened with a grant from the N.C. Rural Center. In addition, Frinsko is leading a Golden LEAF-funded project to develop methods to live-ship prawns to ethnic markets. Prawns are just one aquacultural “crop” produced by North Carolina growers with the help of Cooperative Extension. Aquaculture has grown in roughly two decades into a $55 million North Carolina industry. The latest aquaculture effort from Cooperative Extension and N.C. State University is the Marine Aquaculture Research Center near Marshallberg. Research and Extension programs at this facility will focus on economically feasible methods of growing marine, or saltwater, species.

5. Driving innovation in energy and the environment
Throughout North Carolina, Cooperative Extension is working through agents like Diane Silver to protect one of our most valuable natural resources: clean water. Silver is a natural resources agent stationed in Henderson County. She’s also the Mud Creek watershed coordinator. The waters of Mud Creek, which flows through Henderson County, and two of its tributaries, Clear Creek and Lewis Creek, are considered impaired by the North Carolina Division of Water Quality. These streams are polluted by sediment and other runoff. Silver led an ambitious, multi-year effort funded by U.S. Environmental Protection Agency grants, to begin cleaning up the Mud Creek watershed. This effort involved working with landowners to restore degraded stream banks and with apple and ornamental plant growers to reduce pesticide usage. It also involved considerable public education. Between 2005, when the program began, and 2009, when it ended, 3,424 feet of unstable stream bank that was contributing excess sediment to streams was stabilized. We estimate these efforts are preventing 1,314 tons of soil erosion annually. That’s a good start toward cleaner streams in Henderson County.