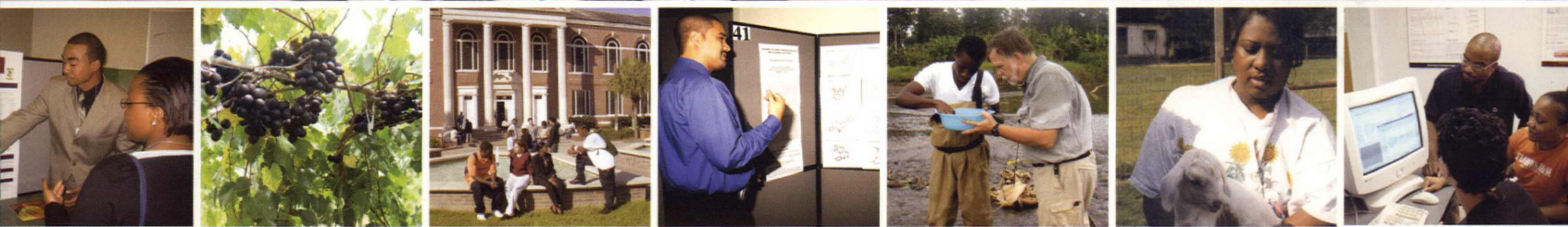


# 2005 Annual Report on Research



*Florida Agricultural & Mechanical University*





## A Message from FAMU Interim President Castell Vaughn Bryant and Vice President for Research Keith H. Jackson



Dr. Castell Vaughn Bryant



Dr. Keith H. Jackson

We are pleased to report that research funding at Florida A&M University reached nearly \$49 million during the 2004-2005 fiscal year. The bulk of funding received was awarded from federal sources such as the Department of Defense, Health and Human Services and the Department of Education. These agencies, and others including state, local and private agencies are looking to FAMU researchers for knowledge in materials science and nanotechnology, environmental science and safety, bioterrorism, drug discovery and delivery, agriculture and much more.

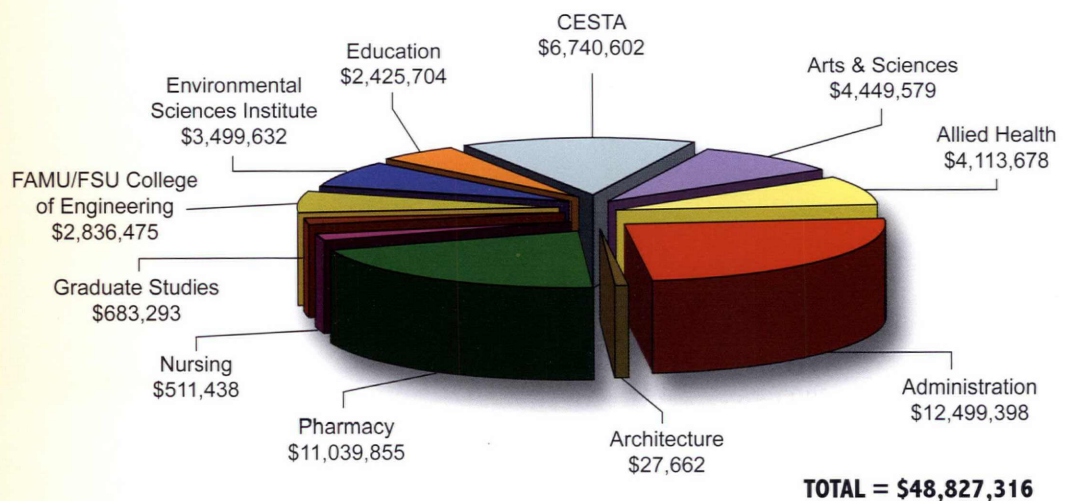
Using creativity and collaborative expertise, FAMU faculty submitted nearly 250 research proposals in 2004-05. Over 60 percent of these proposals were funded. Some of the major proposed work includes research being done by the Department of Physics to develop tools and techniques for remote optical detection of nuclear materials and chemical weapons.

The National Institutes of Health and National Science Foundation are the primary sources for funding basic research. Both of these agencies continue to fund our university through programs such as the Research Centers in Minority Institutions and the Florida-Georgia Louis Stokes Alliance for Minority Participation. For a combined 35 years, both programs continue to produce the majority of African-American graduates in the pharmaceutical and biological sciences, as well as technology, engineering and mathematics.

We are proud of the research programs on our campus and even more proud of the fact that our university has a team of faculty who are dedicated to making sure that Florida A&M University takes its place among world-class educational institutions. Equally valued is the impact their efforts have on the professional development of our students, intellectual life of our communities and academic service to our nation.

This annual report highlights a few of the many accomplishments and advancements FAMU is making in the world of research. There is also a brief mention on a few of the endeavors faculty has recently undertaken that will change the course for how research is conducted in several areas. To learn more about the research enterprise at Florida A&M University, visit [www.famu.edu](http://www.famu.edu).

### Awards Received by School/College/Area 2004 - 2005





## A Brief Selection of Faculty Achievements

**Dr. Folakemi Odedina**, professor in

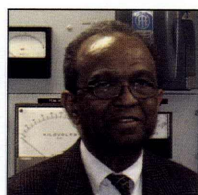
the Economic, Social and Administrative Pharmacy Division, has research that traverses across the world with an international consortium group in Africa, Europe and the U.S. She is well funded and well published and has received numerous awards for her work, including the 2005 Role Model Award Citation by Minority Access, Inc. and the 2004 Association of Black Health-System Pharmacists Research and Publication Award.



Odedina serves on several U.S. and State of Florida initiatives for cancer. She is appointed to the statewide 2005 Florida Prostate Cancer Advisory Committee and is the Interim Co-chair for the Florida Cancer Plan Council. She has also developed a television program, "CancerLink", for community education on cancer issues.

**Dr. Joseph A. Johnson III**, distinguished

professor of science and engineering, along with other scientists in his modern fluid physics laboratory, have discovered new and easier models to predict behaviors important to high speed flight, the remote sensing of hazardous materials and the access to alternative sources of energy for light and heat. Johnson's research focuses on turbulence and nonequilibrium statistical mechanics.



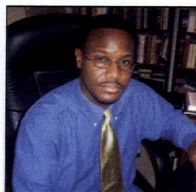
**Dr. David Jackson**, professor of history and chairman of the Department of History, Political Science,

Geography and African-American Studies, has authored two books.

*Go Sound the Trumpet! Selections in Florida's*

*African-American History* chronicles the experiences of African-Americans in Florida from the early Spanish period of the 1500s to the experiences of Black Floridians through the 2000 U.S. presidential elections.

*Retrieving the American Past: A Collection of Readings in African American History* begins with an excerpt from Olaudah Equiano, an ex-slave from Nigeria's Ibo tribe and



continues with essays and documents on the Revolutionary Era, the Antebellum Period, the Civil War and Reconstruction, the Gilded Age and the Progressive Era, World War I, the Interwar Period and World War II.

Jackson was also funded through the Faculty Research Pilot Program to study the southern travels of Booker T. Washington. His research highlights Washington's tours of the southern states from 1908 to 1912.

**Dr. Moses T. K. Kairo** is the new director of the Center for Biological Control. He

is the former director of CAB International Bioscience Laboratory, based in Trinidad and Tobago. Kairo's field of expertise is in biological control and integrated pest management. His research involves invasive species biology and management in more than 10 classical biological control projects in Africa, the Middle East, the Caribbean and Latin America.



**Dr. Roselyn Williams**, associate professor

of mathematics, is the principal investigator of a National Science Foundation grant for the Computer Science Engineering and Mathematics Scholarship Program funded for \$675,000. She is also the principal investigator for the Research Experience Undergraduate (REU) Site grant that supports active research participation by undergraduate students; and she serves as the co-principal investigator of the NSF Alliance for the Production of African-American PhDs in Mathematical Sciences, funded at \$2.5M through 2010.



Williams is an active member of the National Association of Mathematicians.

**Dr. Jennifer Cherrier**, assistant professor

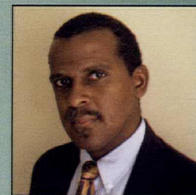
in the Environmental Sciences Institute, was awarded funding twice from the Florida Institute of Oceanography to instruct courses on marine ecosystems and the coastal environments in the northern Gulf of Mexico. Cherrier was also a part of a



team that received a collaborative research grant from the National Science Foundation in the amount of \$761,523 to study carbon fluxes from marine sediments in submarine groundwater discharge.

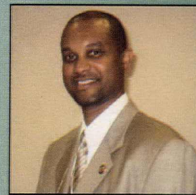
**Dr. Andrew Jones**, associate professor

in the Department of Mathematics, received funding from the Army Research Laboratory for his research on materials processed by fluid flow through porous media. Two of these processes are Vacuum-Assisted Resin Transfer Molding and the Chemical Vapor Infiltration process. Jones is researching how to achieve maximal quality material at minimal cost by modeling and optimizing these processes.



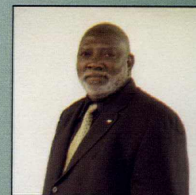
**Dr. Donald Palm**, assistant professor in the College of Pharmacy

and Pharmaceutical Sciences, is principal investigator of the Minority Biomedical Research Support (MBRS) SCORE grant from the National Institutes of Health. The MBRS SCORE grant was renewed in the amount of \$6,227,320 to continue the development of minority student, faculty and institutional involvement in state-of-the-art biomedical research. The program's main objective is to enhance the research infrastructure, attract and recruit highly qualified new minority investigators, stimulate research enthusiasm among existing faculty and increase biomedical research productivity and scientific competitiveness in the institution.



**Dr. Bobby R. Phills**, professor in the

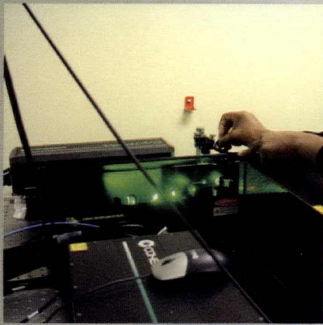
Center for Viticulture and Small Fruits, spent a year on sabbatical leave at the USDA Agriculture Research Service (ARS) and Cooperative State Research, Education and Extension Service (CSREES) in Washington, DC. He served as Assistant to the Administrators and completed a project assignment entitled, "An Interagency Effort to Strengthen and Enhance the Collaborative Relationship of the ARS and the CSREES".





# Research Highlights

## Department of Physics



A 2005 Department of Defense appropriations bill includes \$12 million in contracts for FAMU scientists who will work with scientists at Arkansas State University and the University of Hawaii to develop tools and techniques for remote optical detection of nuclear materials. The Standoff Sensor for Radionuclide Identification (SSRID) collaboration received priority status because of the nature of the work and its importance to National Security. The research will support the programs of the Army Space Missile Defense Command (SMDC).

Dr. Lewis E. Johnson, assistant physics professor, is the principal investigator for the "Laser Interactions with Materials for Identification Technologies (LIMIT)" project with the SMDC. The project requires FAMU to construct a Teraflop class computing cluster, a Terawatt Laser system and other experimental systems for remote sensing. FAMU Physics Professor Joseph Johnson and Environmental Sciences Professor Elijah Johnson are also working on the SSRID collaboration.



## School of Architecture

Faculty and students in the School of Architecture provided community design assistance through a number of state and locally funded projects. These projects have prompted citizen involvement in community planning and development processes by creating a variety of "before and after" images of possible futures for their town. The goals of the projects incorporate pedestrian safety, pedestrian access and streetscaping and land use.

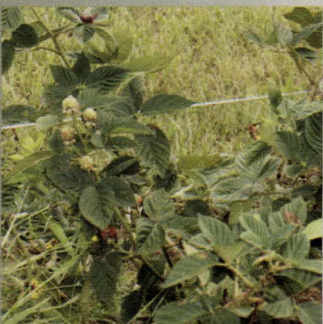
Architecture Professors Andrew Chin and C. L. Bohannon received funding from the Florida Department of Community Affairs and the cities of Newberry, Inglis, Panacea and Port St. Joe, Florida for a Community Design Assistance Center. The Center is a product of the recently completed Community Design Assistance and Development Project funded by the U. S. Department of Housing and Urban Development.

## Allied Health Sciences



The physical therapy graduate program in the FAMU School of Allied Health Sciences was granted full accreditation by the Commission on Accreditation of Physical Therapy Education. Since its re-accreditation, enrollment in the physical therapy program has tripled and the faculty is now in the position to explore the feasibility of offering the program at the doctoral level.

For the past year, the School of Allied Health Sciences has been collaborating with the Florida State University Medical School on the establishment of a Geriatric Education Center. A collaborative grant was submitted in the spring of the year that addressed issues of aging and the focused training of health professionals in geriatric content that is specific to their respective disciplines. The therapy and management-oriented allied health professions are a part of the designed initiative. The grant that was submitted included not only the FSU medical school as the lead institution and the FAMU School of Allied Health Sciences, but also the FAMU College of Pharmacy, programs at the University of South Alabama and the Social Work and Nursing programs at FSU. The grant application was approved and funded for four years for over \$400,000 to the School of Allied Health Sciences.



## Center for Viticulture and Small Fruit Research

Projects in the Center are directly tied to industry needs identified by the Florida Viticulture Advisory Council. The Center also works closely with the Florida Grape Growers in addressing their research needs. Continuous funding from the U.S. Department of Agriculture supports the Center's goals of helping Florida grape growers improve their production and marketing operations, thus making the industry a viable one.



Dr. Stephen Leong, center director, is researching genetic engineering and evaluating transgenic vines for seedlessness. The genomic/bioinformatics program is strengthening through work with the USDA Horticulture Research Lab in Fort Pierce. The Center is expecting significant breakthroughs in identifying important genes related to disease and environmental stress tolerance from the genetics and breeding program.

Dr. Bobby Phills, project leader of the Small Fruit Program, is working with other researchers to evaluate the yield and growth characteristics and disease resistance of selected small fruits in Florida's panhandle, including raspberries. This information is provided to farmers who want to diversify. The plant improvement program examines raspberry genetic improvement for heat tolerance. Given recent advancements in genetic engineering and biotechnology, FAMU researchers are investigating how horticultural traits can be successfully incorporated into a single genotype suitable for growers' usage.



## Environmental Science

The Environmental Sciences Institute was awarded a \$1 million grant from the National Science Foundation to increase research training experiences for minority graduate students and the production of minority PhDs. A collaborative and interdisciplinary team of biogeochemists, ecologists, molecular biologists and modelers will integrate their skills and expertise to characterize in detail the sources, transformations and fate of carbon within the Apalachicola Bay estuary.

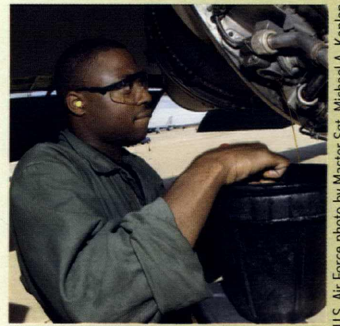
Graduate students and postdoctoral associates will be involved in this multidisciplinary research on carbon cycling and in communicating the knowledge gained from this and other research to students in the classroom making them better teachers and mentors.



## Education Partnership Agreement

FAMU and the Air Force Research Laboratories/Materials and Manufacturing Directorate (AFRL/ML) signed an Education Partnership Agreement to facilitate university students and faculty in research projects involving materials and manufacturing technology at the Wright-Patterson (OH) Air Force Base.

The partnership involves cutting-edge research to aid the nation's defense system. FAMU students receive academic credit for lab work and AFRL personnel teach science, math and engineering courses and provide career guidance and assistance to FAMU students.



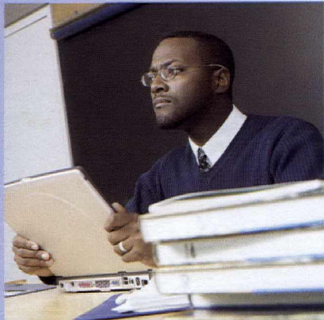
U.S. Air Force photo by Master Sgt. Michael A. Kaplan

## Arts and Sciences Research

The Arts and Sciences Research Initiative and Development Pilot Project, an Extramural Research Development Award (ERDA) funded by the National Institutes of Health, was instrumental in several efforts to increase grant funding among the faculty of the College of Arts and Sciences. Headed by Principal Investigator John Chambers in the Office of Research Development, the project brought to campus several faculty development workshops focusing on researching NIH funding opportunities, writing grant proposals and applications and preparing grant budgets.

The faculty was also supported in their requests to the NIH to view the agency's funded proposals through the Freedom of Information Act. There was also a surge of success in faculty publication rates and student research internships due to new research development initiatives from this project.





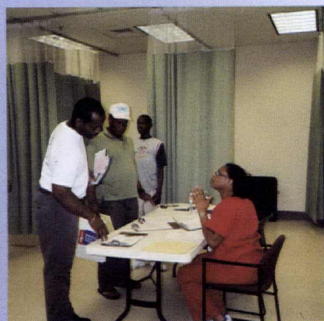
## Teaching and Learning Institute

FAMU is one of 11 "Teachers for a New Era" institutions nationwide that has embraced a reform initiative designed to strengthen PreK-12 education through state-of-the-art teaching programs at schools of education. The Teaching and Learning Institute at FAMU, funded for over \$5 million by The Carnegie Corporation, is designed to improve the quality of teaching and teacher preparation. The project is dedicated to the transformation of public education in the preparation of educators through coursework, clinical experiences in pre-kindergarten to high school settings, research and professional development.

The Teaching and Learning Institute supports collaboration among faculty from the College of Arts and Sciences, College of Education, and the School of General Studies, school-based professionals, faculty from other areas of the university, and pre-service teachers through professional development, training, and research opportunities. It also provides professional support for the graduates' application process for National Board Teacher Certification, as well as support for other in-service teachers.

## Minority Prostate Cancer Training and Research

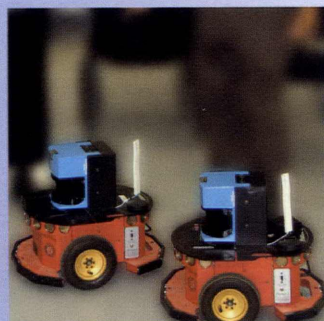
The College of Pharmacy and Pharmaceutical Sciences received \$1,064,029 from the U.S. Army Department of Defense Prostate Cancer Research Program to develop a Center for Minority Prostate Cancer Training and Research. FAMU collaborates with the Moffitt Cancer Center and the Florida Prostate Cancer Network on this grant.



The Center, headed by Dr. Folakemi Odedina, has implemented three major programs—a research component that focuses on prostate cancer disparity experienced by African-American men; a training component that enhances the research capabilities of FAMU faculty, postdoctoral trainees and graduate students; and a community outreach component that is raising awareness about prostate cancer and screening in the African-American community.

## The Robotics Collaborative Technology Alliance Project

The Robotics Collaborative Technology Alliance (CTA) Project at FAMU has brought in over \$3.2 million in five years. The grant, recently renewed for an additional three years through September 2009, has allowed FAMU to partner with the Carnegie Mellon University Robotics Institute, a research giant in robotics and General Dynamics Robotics Systems, the prime contractor. The alliance also consists of several other academic, industry and government lab partners.



Dr. Emmanuel Collins, professor in the FAMU-FSU College of Engineering, is principal investigator for the FAMU Robotics CTA Project. FAMU's focus has been on controlling autonomous ground vehicles (AGVs) in difficult environments such as in cluttered forests, over traversable obstacle piles, and on terrains such as loose sand, mud, or ice. This past year FAMU developed a new algorithm for preventing an AGV controlled by a "reactive" algorithm from becoming stuck in a deadlock situation (think of a dead-end alley). In addition, substantial improvements were made to a terrain identification algorithm that uses internal vibration sensors along with a probability neural network to determine the terrain on which an AGV is traveling in order to properly choose the terrain-dependent control algorithm for the vehicle.



# The Student Research Experience

## Florida-Georgia Louis Stokes Alliance for Minority Participation

Over 450 students attended the 2005 Expo of the Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) in Orlando, Florida. FAMU is the host institution of the 13-member Florida-Georgia alliance that is committed to increasing the production of baccalaureate degrees awarded in science, technology, engineering and mathematics.

Funded by the National Science Foundation, the FGLSAMP project at FAMU has been in operation for 15 years. The project provides activities for its student scholars that compliment classroom learning and professional development. These include tutoring, mentoring, research experiences and graduate school preparation.

## Eli Lilly Continues Support for MBRS Student Research

In its 24th year, the Minority Biomedical Research Support Program-Research Centers in Minority Institutions Program Student Research Forum featured student poster presentations representing the academic disciplines of pharmacy, public health, nursing, allied health, psychology, physical chemistry, pharmaceuticals, medicinal chemistry, environmental sciences, biology and other areas.

The research forum was supported by Eli Lilly and Company and gave students the opportunity to refine the art and science of research paper presentations.

## NSF Funds Invention Summer Camp for Area Students

The Rattler Invention Summer Camp is coordinated and facilitated by the Office of Technology Transfer, Licensing and Commercialization through a grant from the National Science Foundation. There were 33 junior and high school seniors from Tallahassee and surrounding areas, as well as one student from California who participated in the 2005 invention summer camp experience. The requirements for participation included a "B" grade point average, an interest in the sciences, math and engineering and a "wild" imagination.

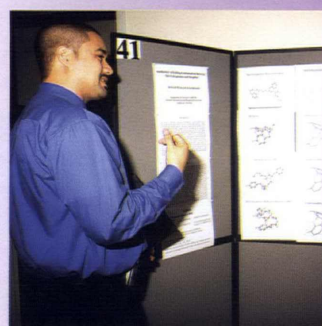
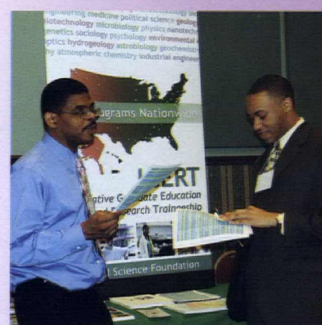
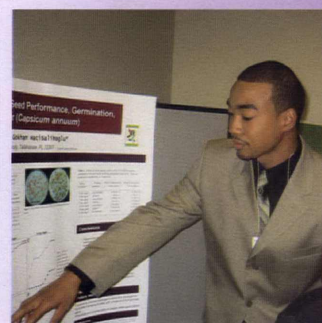
Students were taught the history of inventing, how to determine if their ideas have already been disclosed by others and how to protect their inventions. At the end of the week-long activity, students formally presented their inventions and marketing strategies to the public. The program aims to inspire students to pursue inventing in the areas of science, mathematics, engineering or patent law.

## NSF FAMU-UP Finds Success

The Undergraduate Program (UP) is a member of the second cohort of National Science Foundation funded HBCU-UP projects. This five-year \$3.5 million project opened on the campus of FAMU in 1999 and targeted students majoring in science, technology, engineering and mathematics (STEM). Its principal components were: student enrichment; curriculum reform; and faculty development. Its focus was to increase the number of underrepresented students in STEM PhD programs.

Over the last six years, it is estimated that the FAMU-UP has provided over 5,000 students and more than 40 faculty members the opportunity to participate in one or more project activities. FAMU students have worked as peer-assisted learning (PAL) facilitators, Stratus mentors, teaching assistants, graders, research assistants, graphic artists, website designers, network technicians, computer lab assistants and student program coordinators. Over \$1 million was provided to students for wages, stipends and travel expenses. Nearly 50% of FAMU-UP student employees who have earned their undergraduate degrees in STEM areas chose to go directly to graduate school.

The FAMU-UP has received a second cycle of funding from the NSF that will focus on learning communities for STEM students.







## Taking Research to Another Level...

The Office of Technology Transfer has begun to take FAMU research to a whole new level by seeking patent protection for faculty. The Office of Technology Transfer is responsible for protecting the intellectual assets of the University. FAMU receives millions of dollars in external research funding from various sources including the federal government. Within the last 25 years, federal agencies have raised the bar for financing research projects at American universities.

Prior to 1980, federal agencies would fund projects where the only objective or tangible outcome would be a scholarly publication in a reputable journal. However, since the passage of the Bayh-Dole Act in 1980, federal agencies have become very selective about how it spends its resources. The selection criteria now include factors that demonstrate how society will be impacted by their research. Interestingly, one of the most significant factors that agencies would like professors to address in their research proposals is the impact that their research will have on society. Clearly, one of the most effective ways for a research proposal to impact society is to fund research that is likely to yield products with significant commercial potential.

The Office of Technology Transfer has been supporting this notion by diligently seeking patent protection and educating the faculty on the importance of publishing and patenting research results. Below are just three FAMU inventions that have commercial potential.

Dr. Nazarius Lamango has developed a method of manipulating the symptoms of Parkinson's disease. Parkinson's disease is generally recognized through uncontrolled tremors in elderly adults due to an over production of S-adenosyl-L-Methionine (SAM). In the presence of too much SAM, cellular communication is disrupted which results in the body displaying Parkinson's related behavior. Lamango's patented method is designed to permit the targeted cells to properly communicate with each other despite the increased level of SAM. Details of our patented process are described in U.S. Patent 6,372, 793.



Dr. Christopher Ikediobi, professor of chemistry, has discovered organic compounds that will attract mosquitoes. Generally, mosquitoes have been controlled by using chemical repellants. However, a more effective way to control mosquitoes is to use chemicals attract or lure them into a trapping mechanism. Ikediobi has developed analogs that are very similar to Octenol, a well known mosquito attractant, but are more effective than Octenol at attracting mosquitoes. The mosquitoes are lured into a trapping device by a unique formulation of the Octenol analogs, trapped and disposed of as a means for controlling the mosquito population in the U.S. and abroad.

Drs. Philippe Masson and Cesar Luongo have developed an all-electric superconducting motor with a novel topology that can be installed in aircraft, buses and automobiles. The unique design of the motor provides car and plane manufacturers with the technology to manufacture affordable, non-polluting devices.



# In the Pipeline

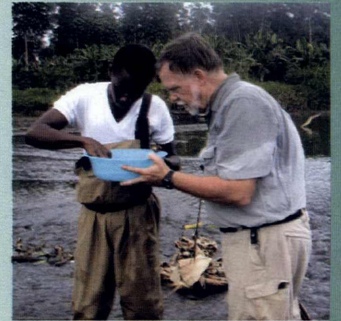
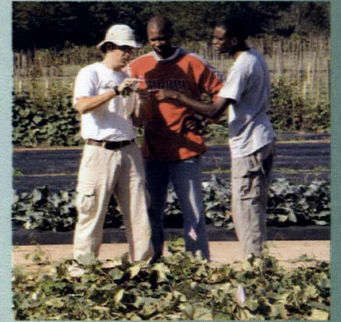
## Center for Biological Control

The Center for Biological Control is housed in the College of Engineering Sciences, Technology and Agriculture. Led by Dr. Moses T. K. Kairo, the Center is involved in identifying biological control agents for insect pests affecting the major vegetable and fruit crops in North Florida. Working closely with the USDA to identify invasive insects important to the state of Florida, researchers have developed a web-based expert system to help other scientists and professional workers identify some of the invasive species. The Center received a \$200,000 grant from the USDA Animal and Plant Health Inspection Service to support these projects. Major cooperative work in developing a biodiversity inventory of the country of Costa Rica is also underway.



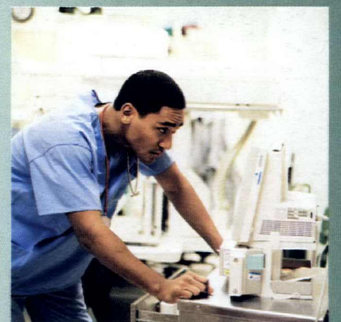
## Center for Community Health

An \$800,000 federal appropriation for the construction of a new Center for Community Health, Healthcare, Wellness, Training and Research at FAMU will provide research and training activities in the elimination of health care disparities. The Center will serve as a clinic that allows for the treatment of diseases and disorders that are common in minority communities; a wellness site to maintain states of positive health; and a prevention repository that allows individuals to learn from professionals and peers, approaches aimed at preventing the onset of disease. The Center will also serve as a site for research in social, scientific, behavioral and environmental arenas.



## Army Future Combat Systems

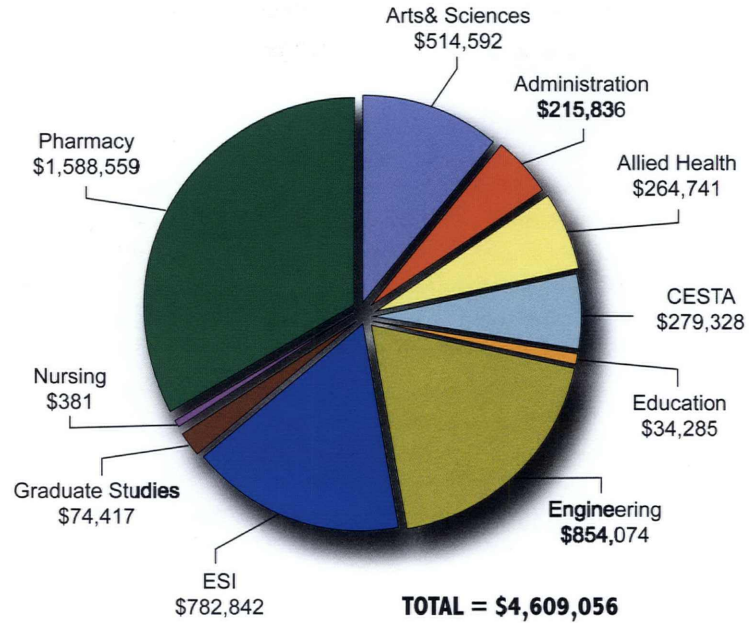
The Florida Advanced Center for Composite Technologies (FAC<sup>2</sup>T) at FAMU and South Dakota School of Mines and Technologies have partnered with the U.S. Army Research Lab to develop unmanned ground and aerial vehicles within the Future Combat Systems fleet that will autonomously gather intelligence and carry out tactical missions on land and in air. Federal funding for \$2.8 million has been appropriated to research efforts to create strong and lightweight vehicles made with multi-utility materials, incorporating advanced sensors embedded within composite structures. To reduce manufacturing costs and maximize system performance, advanced process models and low-cost processing technologies are being developed, validated and implemented to monitor and adjust various critical processing parameters in real time.



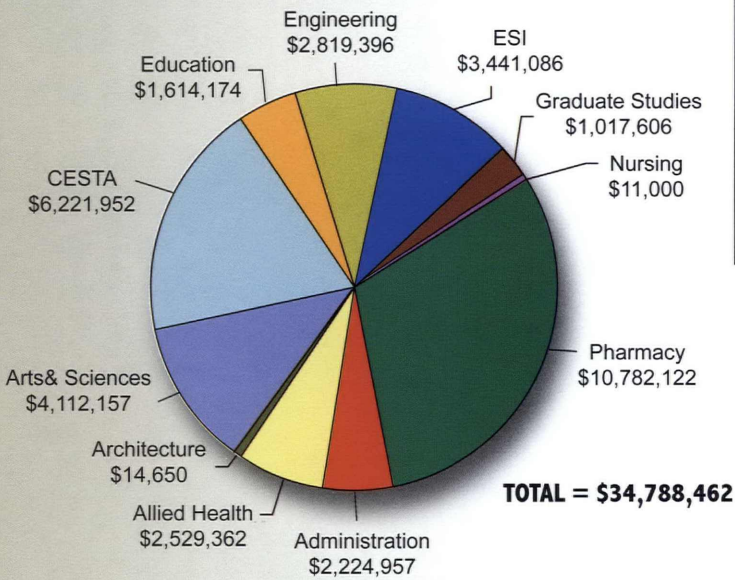


# Research Funding

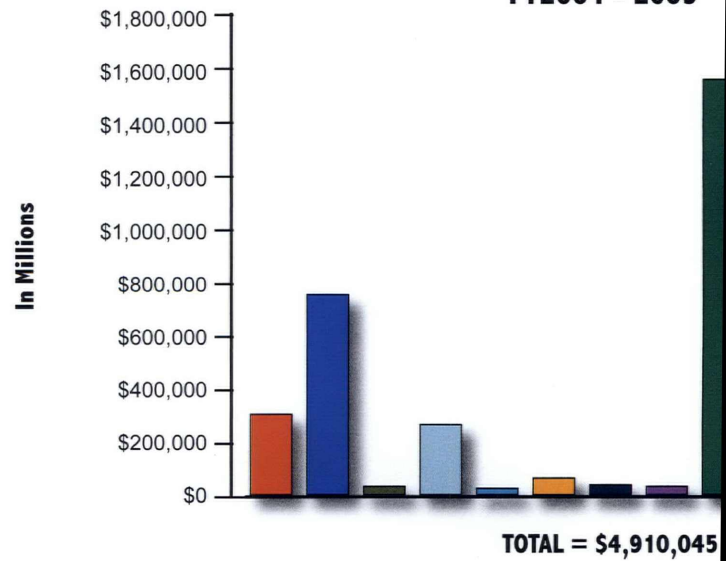
**F&A Costs Recovered through Research Grants by School/College/Area: 2004-2005**



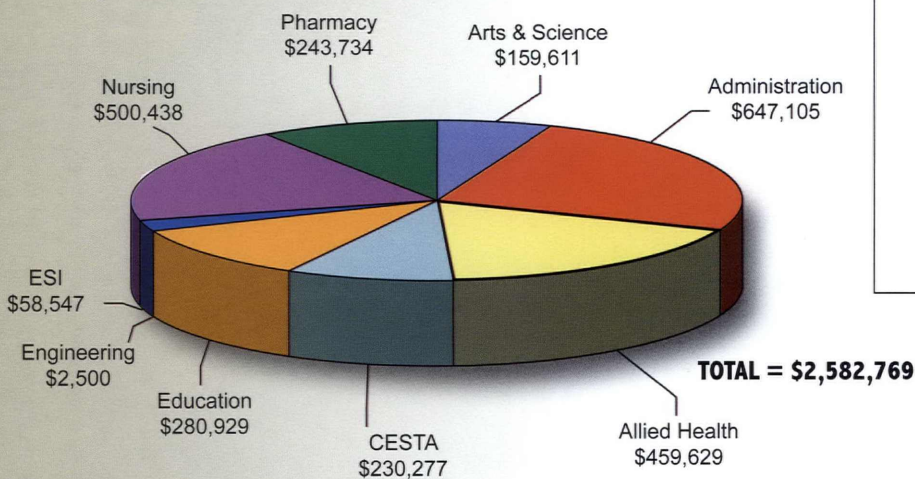
**Awards Received for Research Grants by School/College/Area**



**F&A Recovered by Area FY2004 - 2005**

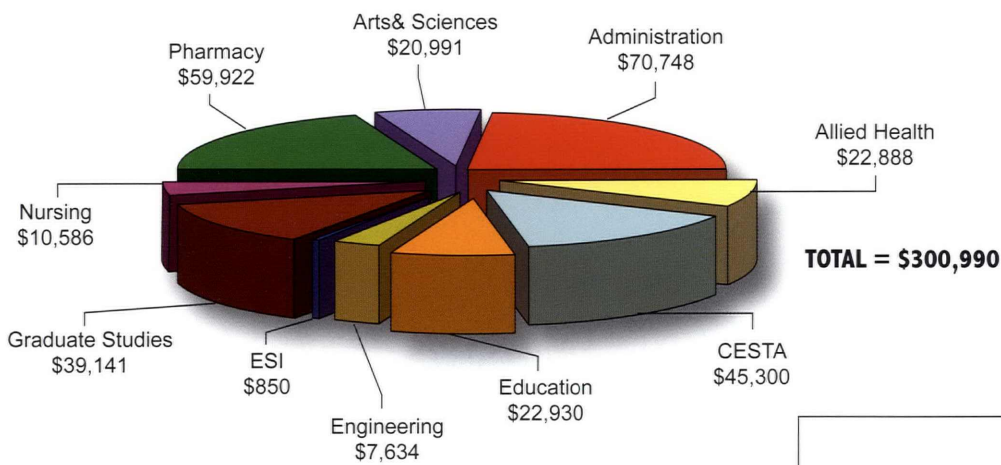


**Awards Received for Training Grants by School/College/Area: 2004 - 2005**

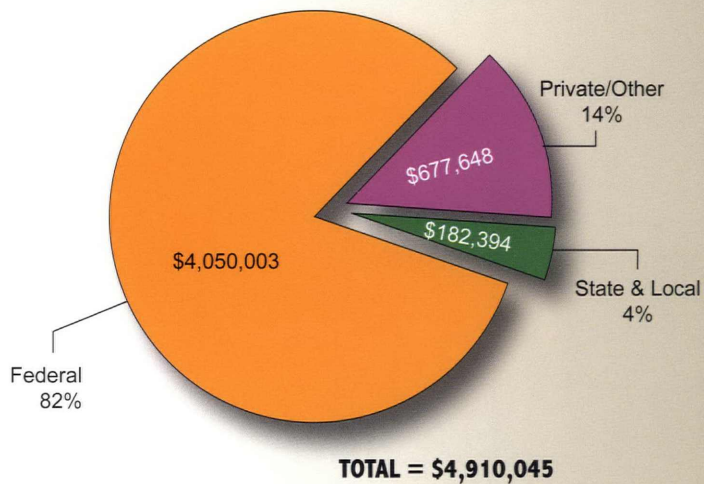




**F&A Costs Recovered through Training & Other Grants by School/College/Area: 2004 - 2005**

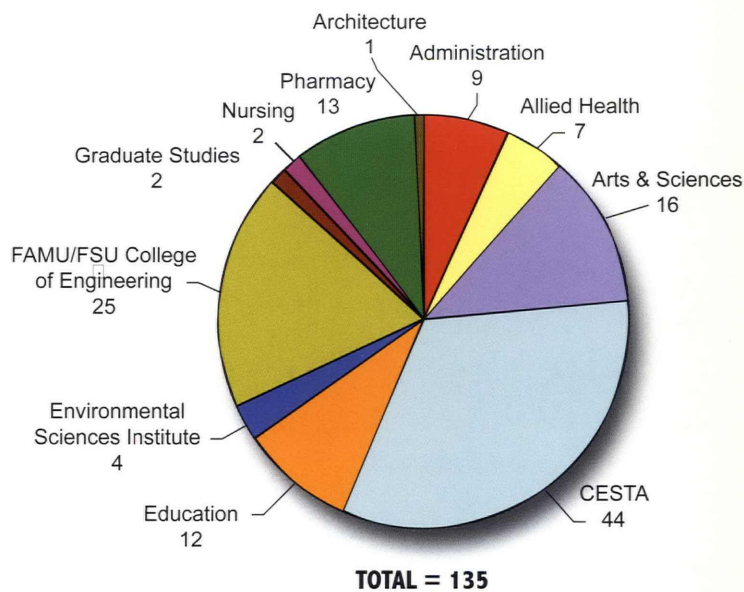


**FY2004 - 2005 Research Awards by Sponsor Type**



- Administration
- Environmental Sciences Institute
- Architecture
- CESTA
- Journalism
- Education
- General Studies
- Nursing
- Pharmacy
- Allied Health
- Arts & Sciences
- Graduate Studies
- Engineering

**Number of Awards Received for FY2004 - 2005**





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# Division of Research

Florida A&M University

Division of Research

Office of the Vice President

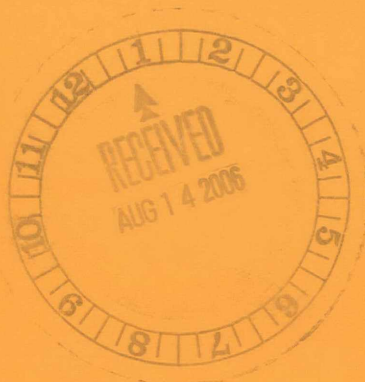
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