



CREST

CENTERS OF RESEARCH EXCELLENCE IN SCIENCE AND TECHNOLOGY

NATIONAL SCIENCE FOUNDATION
DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
DIVISION OF HUMAN RESOURCE DEVELOPMENT





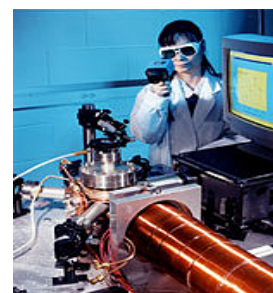
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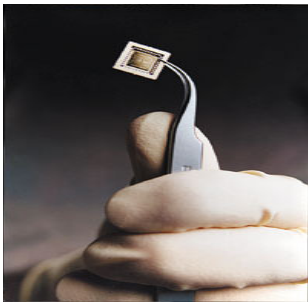
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Front Cover–Agriculture Science, Danise Coon, 2003; Nuclear Magnetic Resonance Magnet, National High Magnetic Field Laboratory, 2002; Classroom Follow Up, Barry Myers, 2002; Blue Swirl Fractal, Frances Griffin 1997; Solar Acoustic Wave, John W. Harvey, National Solar Observatory, 1985. **3**–Atom Trap, Argonne National Laboratory, 2001. **4**–EPSCoR Computer Chip, University of Alabama, 1999. **5**–First Magnetic Resonance Scanner, FONAR Corporation, 1977. **6**–Michael Busby, Tennessee State University, 2005. **7**–Center for Advanced Materials and Smart Structures, James Powluk, 2006. **8**–(top) Tuskegee University, 2005 (bottom) Engineering Biological Bodies, Georgia Tech/Emory Center, 2002. **9**–Carl E. Bonner, Jr., Norfolk State University, 2005. **10**–Jackson State University, 2005. **11**–CEA-CREST, 2005. **12**–Center for Mesoscopic Modeling and Simulation, 2005. **13**–Elvira Cuevas and Joel Ruiz, University of Puerto Rico, Rio Piedras, 2005. **16**–RESSACA, 2005. **17**–James Mitchell, Howard University, 2005. **18**–Florida International University, 2005. **19**–New Mexico State University, 2005. **20**–Warren Collins, Fisk University, 2005. **21**–Alabama A&M University, 2005. **22**–Florida A&M University, 2006. **23**–Doyle A. Temple, Hampton University. **24**–Nouriddine Melikechi, Delaware State University, 2006. **25**–Clark Atlanta University, 2006. **26**–Biogeochemical education, Susan Pfiffner, 2003. **27**–Silicon Nanocrystal, Lucas Wagner, Quantum Simulations Laboratory, North Carolina State University, 2002.

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Overview

Established twenty years ago, the Centers of Research Excellence in Science and Technology (CREST) program provides a substantial source of Federal support for research at minority-serving institutions across the United States. By facilitating research projects in science, technology, engineering and mathematics (STEM) disciplines with multi-year, multi-million dollar cooperative agreements, the main goal of CREST and its awardees is to build the research competitiveness of minority-serving institutions while increasing the recruitment and retention of individuals from diverse backgrounds in STEM study and STEM-based careers.

To date, more than 25 long-term, large-scale projects have received CREST funds. The variety and scope of these CREST projects encompass nearly every traditional STEM discipline and seek to advance human knowledge by defining innovative new areas of study. Each CREST project strives to build upon the state of the art in its particular research areas, while at the same time bringing these advancements to the next generation of STEM practitioners and the general public. A particular emphasis is placed upon increasing the recruitment and retention of historically underserved populations in quality STEM study and productive, fulfilling STEM careers. To this end, CREST sites are expected to complement their research efforts with innovative new education programs and to forge lasting, mutually beneficial links to other learning institutions, regional industries and national laboratories. In this way, each Center becomes a vital, contributing part of the local community that will continue to benefit the national interest long after Federal support has ended. The cutting-edge practices and human capital involved in CREST projects also make these projects an attractive means for recruiting new intellectual talent and garnering international recognition for U.S. scientific research.

To bring the principles of CREST to a more focused group of eligible schools, the program has begun support for the initiative, Historically Black Colleges and Universities-Research Infrastructure for Science and Engineering (HBCU-RISE). Although CREST began making provisional HBCU-RISE awards in FY 2002, the first full HBCU-RISE competition was not held until FY 2003. After 4 annual proposal competitions, 13 institutions have received HBCU-RISE funds.

The list of CREST awards is as diverse and engaging as the communities these projects have served and continue to support. This publication summarizes the CREST projects supported since FY 1987 and describes the current cohort of awardees. As a nation, we have much to learn from them, collectively and individually.

Note: Awards tabulated and detailed on pages 6 to 26 are listed chronologically by award number. Further information on CREST awards can be found at: <http://www.nsf.gov/awardsearch/> by using the award number(s) indicated. For updates on current CREST activities and deadlines, visit the program Web page at: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6668.

Program History



The CREST program represents a substantial portion of the National Science Foundation's investment in research at minority-serving institutions.

The CREST program has the goal of strengthening the national research competitiveness of minority-serving institutions as well as increasing the number of underrepresented minorities awarded master's and Ph.D. degrees in STEM fields. Funded at levels of between \$8.7 million and \$17.8 million annually, CREST represents a substantial portion of the National Science Foundation's (NSF's) investment in research at minority-serving institutions.

Center awards, issued via a cooperative agreement with the lead institution, are typically funded for up to \$1 million per year for up to 5 years. Centers that successfully complete one cycle of CREST funding are eligible to compete for a second cycle of funding. A number of past CREST awardees have qualified for a renewal and have graduated from the program after 10 years of CREST support, the maximum currently allowed. CREST's ability to make awards is contingent upon the NSF budget and program's annual funding appropriations. Consequently, only 8 competitions for CREST awards have been held since the program's inception. Two CREST awards were made in Fiscal Year (FY) 1987, four in FY 1988, two in FY 1991, four in FY 1997, and four in FY 1998. The FY 2002 CREST competition resulted in the renewal of two Centers and the award of three new Centers, the FY 2003 competition resulted in four renewals and two new Center awards, the FY 2004 competition resulted in three new Center awards and the FY 2006 yielded four new Center awards. During this interval, nine Centers completed one cycle of CREST funding, with eight of these eventually completing two cycles (10 years) of program support. In FY 2002, CREST additionally began supporting Historically Black Colleges and Universities - Research Infrastructure for Science & Engineering (HBCU-RISE) with the intent of increasing the production of minority Ph.D.s in science, mathematics and engineering.

CREST responds to each of NSF's four strategic outcome goals—Discovery, Learning, Research Infrastructure and Stewardship—as detailed in the Strategic Plan (2006-2011), online at <http://www.nsf.gov/strategicplan>. Since 2001, CREST researchers have published more than 650 manuscripts and made hundreds of research presentations in 14 countries. From 2001 to 2003 alone, some 272 degrees were awarded to CREST participants. Over the same interval, the participation of minority students in CREST projects increased from 18 percent to 27 percent and the participation of female students in CREST projects increased from 31 percent to 37.5 percent. Faculty and postdoc participation demonstrated similar positive gains as a result of CREST support.

Note: CREST and HBCU-RISE are institutional awards. CREST applicants must be minority-serving institutions. HBCU-RISE applicants must be accredited Historically Black Colleges or Universities in the United States or its territories. Interested applicants should consult the U.S. Department of Education's Office of Civil Rights (online at: <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>) to confirm their institution's eligibility for CREST or HBCU-RISE.



Center for Systems Science Research

NSF Award: 9706268 & 0206028

Institution: Tennessee State University, 3500 John Merritt Boulevard, Nashville, TN 37209

Contact: Leehyun Keel, Center of Excellence Information Systems. Phone: (615) 963-7025; fax: (615) 963-7027; e-mail: keel@gauss.tsuniv.edu

Internet: <http://explorers.tsuniv.edu/cssr/>

Tennessee State University's Center for Systems Science Research (CSSR) combines a diverse portfolio of activities, ranging from mathematical modeling to Astronomy. The project includes components from Mathematics, Physics, Astronomy, Electrical Engineering and Mechanical Engineering. The research base

established by CSSR continues to produce new knowledge, techniques and discoveries. In 2006, CSSR researchers led an international team that discovered a planet around the star HD149026. The new planet's structure is so unique it challenges currently established theories for planet formation. Such discoveries directly enhance research and education opportunities. During the project's first 4 years, CSSR personnel published 171 articles, 139 of which were in refereed journals or included in conference proceedings. Over the same period, the Center has supported an average of 35 undergraduate and 7 graduate African-American students per year. Support for both graduates and undergraduates has averaged over \$200,000 per year for various combinations of tuition, fees, room and board, and stipends. Students present their work at the TSU university-wide research symposium and at the NSF/NASA/TSU student research symposium. Students have also been co-authors with CREST researchers on journal articles and conference papers. In the Fall 2001 semester, the university began enrolling students in the newly established Ph.D. program in Computer Information Systems Engineering, which is housed in the College of Engineering, Technology and Computer Science.

During the project's first 4 years, CSSR personnel published 171 articles, of which 139 were in refereed journals or included in conference proceedings.

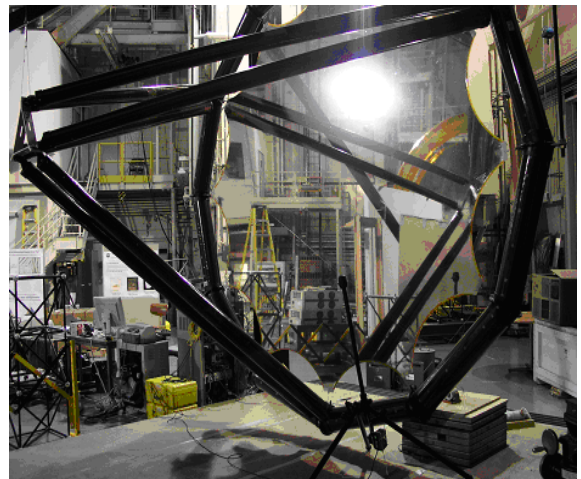
Selected Publications

Adetona, O. 2004. Robust adaptive control of nonaffine nonlinear plants with small input signal changes. *IEEE Transactions on Neural Networks*, Volume 15.

Paulson, DB, SH Saar, WD Cochran and GW Henry. 2004. Searching for planets in the Hyades III: The quest for short-period planets. *Astrophysical Journal*, Volume 127.

Sathanathan, S and LH Keel. 2004. Convergence and stability of stochastic hereditary iterative processes. *Dynamics of Continuous, Discrete and Impulsive Systems*, Volume 11.

Tao, Y and R Moreno. 2004. A 3-D Micro network piping convective heat sink with NPCM suspension fluid. *Journal of Heat Transfer*, Volume 126.





Center for Advanced Materials and Smart Structures

NSF Award: 9706680 & 0205803

Institution: North Carolina Agricultural & Technical State University. IRC Building, Room 242, Greensboro, NC 27411

Contact: Jagannathan Sankar, Department of Mechanical Engineering. Phone: (336) 256-1151; fax: (336) 256-1153; e-mail: sankar@ncat.edu

Internet: <http://camss.ncat.edu>

Nanoscale science and technology is expected to revolutionize next-generation technology ranging from structural materials to smart structures and from microelectronics to medicine.

North Carolina A&T State University's Center for Advanced Materials and Smart Structures (CAMSS) conducts research in three areas: nanoengineered and surface-engineered coatings and materials; nanocomposites and other innovative composites; and electronic and smart materials and structures. Structural ceramics have unique properties that can be used to

great advantage in advanced high-temperature applications. Innovative ceramic composites are also being developed for use in high-temperature applications, wear-resistant materials, and novel sensor and smart-structure applications. Nanoscale science and technology is expected to revolutionize next-generation technology ranging from structural materials to smart structures and from microelectronics to medicine. CAMSS seeks to continue the promotion of advanced materials engineering as a unifying research and education discipline, including the development of new curricula and the recruitment of talented undergraduate and graduate students from ethnic and economic groups historically underrepresented in science and technology. More than 260 students have participated in CAMSS since 1998 and 82 are currently enrolled in CAMSS activities. In the past year, 40 percent of the institution's Ph.D. graduates (7 of 17) came from CAMSS. Center participants have now published more than 65 peer-reviewed articles, delivered 73 international conference presentations and registered two patents. The Center is a state and national educational and research resource in the field of advanced materials and their composites, developing research programs with a focus on student participation and learning.



Selected Publications

Kumar, D, SJ Pennycook, J Narayan, H Wang and A Tiwari. 2003. Role of Silver addition in the synthesis of high critical current density MgB_2 bulk superconductors, *Superconductor Science and Technology*, Volume 16(4).

Neralla, S, D Kumar, S Yarmolenko and J Sankar. 2004. Mechanical properties of nanocomposite metal-ceramic thin films. *Composites, Part B: Engineering*, Volume 35(2).

Xu, Z, J Sankar and S Yarmolenko. 2004. Yttria-stabilized zirconia coatings produced using combustion chemical vapor deposition. *Surface and Coatings Technology*, 177-178, 52-59.



Synthesis, Manufacturing and Characterization of Structural Nanocomposites

NSF Award: 9706871 & 0317741

Institution: Tuskegee University, Tuskegee Institute, AL 36088

Contact: Shaik Jeelani, Department of Mechanical Engineering. Phone: (334) 727-8970; fax: (334) 724-4224; e-mail: jeelanis@tuskegee.edu

Internet: <http://www.tuskegee.edu>

The Tuskegee University Center for Innovative Manufacturing of Advanced Materials has succeeded in stimulating and producing cutting-edge materials research in the study of nanoparticle-polymer interactions. The Tuskegee CREST has also assembled a diverse team of researchers to study the entire spectrum of technology related to the synthesis, fabrication and characterization of structural nanocomposites. With CREST support since 1997, extensive scientific, technical, and educational advances have been made in each of the research areas of the project. Tuskegee's Ph.D. program in Materials Science and Engineering was launched within a year of establishing the CREST Center. Twenty-one master's students and 25 undergraduate students have completed their research under the CREST program and have graduated from the university; 12 students are currently enrolled in the project. A majority of students in the program are African Americans and one-third are female. Sixty refereed publications in journals and conference proceedings have resulted from the research performed with CREST support. The project also involves collaborative research and education activities with Auburn University, Purdue University, the University of Illinois at Urbana-Champaign, and the University of South Alabama. In addition, scientists at Boeing, Raytheon, TRW, the Air Force Research Laboratory, NASA's Marshall Space Flight Center and the University of Wisconsin.

Tuskegee's Ph.D. program in Materials Science and Engineering was launched within a year of establishing its CREST Center.

Selected Publications

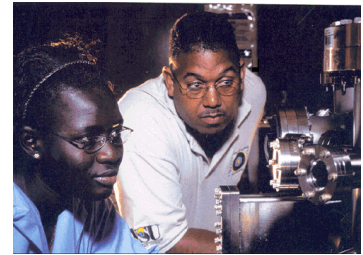
Kanny, K. 2004. Static and dynamic characterization of polymer foams under shear loads. *Journal of Composite Materials*, Volume 38.

Mahfuz, H. 2004. Fabrication, synthesis and mechanical characterization of nanoparticles infused polyurethane foams. *Composites-Part A*, Volume 35.

Thomas, T. 2004. Dynamic compression of sandwich composites at sub-ambient temperatures. *Journal of Composite Materials*, Volume 38.



Center for Photonic Materials Research



NSF Award: 9805059 & 0317722

Institution: Norfolk State University, 700 Park Avenue, Norfolk, VA 23504

Contact: Carl E. Bonner, Jr., Center for Materials Research. Phone: (757) 823-2097; fax: (757) 823-9054;
e-mail: cebonner@nsu.edu

Internet: <http://vigyan.nsu.edu/~cmr/>

The CPMR project has dramatically improved the research competitiveness of the physical sciences faculty and helped in building NSU's national recognition in the field of photonic materials.

Norfolk State University (NSU) is the home of the Center for Photonic Materials Research (CPMR), which focuses on the fields of photonics and nanotechnology. The Center complements and strengthens the ongoing research and educational projects at NSU in the key areas of photonics, spintronics and nanomaterials by enhancing the research potential of existing faculty, providing capital

equipment, student-support resources and adding tenure track and research faculty. These improvements will enable the university to sustain its advanced materials research and engineering activities beyond the duration of CREST support.

A particular achievement of the Center has been to increase the number of underrepresented minority students interested in these fields prepare and them for positions of leadership in emerging areas of science and technology. The project has initiated a Ph.D. program in Materials Science and Engineering that builds upon the strength of the existing master's program in Materials Science. NSU will also develop master's programs in Optical Engineering and Electronics Engineering. The CPMR project has

Selected Publications

Ibrahim, W, CE Bonner, Jr., H El-Sayed Ali and M Shinn. 2004. Femtosecond damage threshold of multi-layer metal films. *International Journal of Heat Transfer*, Volume 47.

Noginova, N, and V Atasarkin. 2004. NMR and spin relaxation in $\text{LaGa}_{1-x}\text{Mn}_x\text{O}_3$: Evidence for thermally activated internal dynamics. *Physics Review B*, Volume 69.

Noginov, M, M Bahoura, G Zhu and I Fowlkes. 2004. GaAs random laser. *Laser Physics Letters*, Volume 1.

Sun, S. 2004. Improving opto-electronic efficiency via bridged donor and acceptor block copolymers. *Poly Materials Science and Engineering*, Volume 90.

dramatically improved the research competitiveness of the physical sciences faculty and helped in building NSU's national recognition in the field of photonic materials. During the past 4 years of CREST support alone, more than 100 research publications and presentations have been produced by CPMR faculty and students, including 26 publications in peer-reviewed journals. Thirty-four graduate and 43 undergraduate students have been supported by CPMR projects.



Computational Center for Molecular Structure and Interactions

NSF Award: 9805465 & 0318519

Institution: Jackson State University. 1400 J.R. Lynch Street, Jackson, MS 39217

Contact: Jerzy Leszczynski, Department of Chemistry. Phone: (601) 979-3482; fax: (601) 979-7823;
e-mail: jerzy@ccmsi.us

Internet: <http://ccaix.jsums.edu/~sst/crest.htm>

The Computational Center for Molecular Structure and Interactions (CCMSI) at Jackson State University (JSU) develops efficient computational methodologies and their application to the study of structures and the properties of molecules. CCMSI faculty conduct collaborative research on the structures and properties of molecules ranging from nanoscale systems to large biomolecules.

The JSU CREST has been recognized for its innovative leadership in computational chemistry at the national and international levels through peer-reviewed journals, conferences and prestigious awards.

Over 8 years of CREST support, CCMSI personnel have generated 412 research papers, 16 books, 500 presentations, 3,000 citations, and 48 invited talks. The Center has published 50 to 60 papers per year in leading peer-reviewed journals in addition to giving 50 to 90 presentations at national and international conferences. Many of these efforts were co-authored by undergraduate and graduate students. the program expects to graduate three to five students per year,

positioning JSU among the nation's largest producers of African-American Ph.D.s in chemistry. CCMSI has also graduated 8 Ph.D.s and 6 MS students, 50 percent of whom are African American.

Selected Publications

Cain, D, DM Pawar and EA Noe. 2004. Conformational studies of trans-cycloheptene, trans-cycloheptene oxide and trans-bicyclo [5.1.0] octane by ab initio calculations. *Theochem*, Volume 674.

Deng, T and M Huang. 2004. Capillary electrophoretic separation and theoretical study of inclusion complexes of sulfobutyl ether α -cyclodextrin with estrogens. *International Journal of Quantum Chemistry*, Volume 100.

Gorb, L, Y Podolyan, P Dziekonski, WA Sokalski and J Leszczynski. 2004. Double-proton transfer in adenine-thymine and guanine-cytosine base pairs. A Post-Hartree-Fock ab initio study. *Journal of the American Chemical Society*, Volume 126.

Xiao, C, J Blundell, F Hagelberg and WA Lester, Jr. 2004. Silicon clusters doped with an yttrium metal atom. *International Journal of Quantum Chemistry*, Volume 96.

The JSU CREST has been recognized for its innovative leadership in computational chemistry at the national and international levels through peer-reviewed journals, conferences and prestigious awards. CCMSI students have benefited from networked research collaborations with more than 18 countries worldwide. Over the past 4 years, the Department of Chemistry at JSU has become the most research-active STEM department in Mississippi and ranks among the nation's top producing HBCU Chemistry departments.

Center for Environmental Analysis (CEA-CREST)



NSF Award: 9805529 & 0317772

Institution: California State University. 5151 State University Drive, Los Angeles, CA 90032

Contact: Carlos D. Robles, Department of Biological Sciences. Phone: (323) 343-5799; fax: (323) 343-5429;
e-mail: crobles@calstatela.edu

Internet: <http://cea-crest.calstatela.edu>

CEA-CREST researchers formulated a spatially explicit model of marine predator-prey dynamics, providing an alternative to hypotheses that prevailed as general theory for more than three decades.

The Center for Environmental Analysis CREST (CEA-CREST) is conducting multidisciplinary environmental research under the theme of Spatially Structured Dynamics. CEA-CREST researchers have made a series of novel discoveries in Environmental Science. As one example, CEA-CREST researchers formulated a spatially explicit model of marine predator-prey dynamics, providing an alternative to hypotheses that prevailed as

general theory for more than three decades. Over the first 4 years of the project, CEA-CREST faculty's refereed publications increased 153 percent, from 17 to 43; presentation of abstracts increased 138 percent, from 16 to 38; and total grant dollars (not including the CREST award) increased 33 percent, from \$2.07 million to \$2.73 million. Fourteen CEA-CREST fellows graduated in the program's first 4 years, with 11 of these entering Ph.D. programs. To date, 26 CEA-CREST Graduate Fellows have graduated, 17 of whom have been accepted to Ph.D. programs, many at University of California campuses. Of the 17 Ph.D. candidates, 14 were from underrepresented minority groups and 3 were Caucasian women. Nine of the CEA-CREST graduates entered agency careers rather than Ph.D. programs, and 6 of the 9 were from underrepresented groups.

To open more educational opportunities for the diverse pool of CEA-CREST student fellows, the Center has revised an existing interdisciplinary master's degree program and is establishing a joint doctoral degree with the University of California. CEA-CREST has formed other partnerships with major national research centers, including the University of California at Santa Barbara and several other schools in the region. Other CEA-CREST collaborators include Cornell University, Oak Crest Institute of Science (Pasadena, CA), Bodega Bay Marine Laboratory, the University of California, Los Angeles, and the California Institute of Technology.

Selected Publications

Hibbs, B and C Eastoe. 2003. Binational study of the surface and groundwater resources of the El Paso/Juarez international corridor. *Water Resources Update*, Volume 125.

Hibbs, B and C Eastoe. 2003. Hydrogeological and isotopic study of the Hueco Bolson aquifer, El Paso/Juarez Mexico area. *Hydrological Science and Technology*, Volume 19.

Stow, D and J Gamon. 2004. Remote sensing of vegetation and land-cover change in Arctic Tundra ecosystems. *Remote Sensing of Environment*, Volume 89.

CMMS

Center for Mesoscopic
Modeling and Simulation

Center for Mesoscopic Modeling and Simulation

NSF Award: 0206162

Institution: CUNY City College, Convent Avenue at 140th Street, New York, NY 10031

Contact: Charles B Watkins, Department of Mechanical Engineering. Phone (212) 650-5439; fax: (212) 650-8013;
e-mail: watkins@ccny.cuny.edu

Internet: <http://www.ccny.cuny.edu/cmms/>

The City University of New York City College's Center for Mesoscopic Modeling and Simulation (CMMS) focuses on physicochemical modeling, simulation and analysis of several distinct but physically related condensed matter and materials systems. Classical mechanics cannot completely describe complex macroscopic systems;

at the atomic level, quantum interaction theory is intractable for complex molecules and ensembles. For these reasons, mesoscopic mathematical models must be devised as the tools for understanding macroscopic and microscopic behavior. Many of these models involve similar features, such as combinations of semi-empirical and exact formulations and inclusion of quantum effects. The common, thematic areas of modeling research within CMMS's research areas provides a framework for the Center's educational activities. Such activities have included formal computational science courses, seminars, internships and training in parallel and distributed processing systems administration.

The common, thematic areas of modeling research within CMMS's research areas provides a framework for the Center's educational activities.

Selected Publications

Akins, D, G Haiquan, W Xu and X Zhang. 2003. Spectroscopy and dynamics of DCM encapsulated in MCM-41 and Y Zeolite mesoporous materials. *Journal of Molecular Structure*, Volume 689.

Andreopoulos, Y. 2003. A new laser vorticity probe, LAVOR: its development and validation in a turbulent boundary layer. *Experiment in Fluids*, Volume 34.

Hammonds, J. 2003. The effect of laser light propagation through a self-induced inhomogeneous process gas on temperature-dependent laser-assisted chemical etching. *International Journal of Heat and Mass Transfer*, Volume 46.

Xanthos, S and Y Andreopoulos. 2003. Boundary layer separation induced by successive favorable and adverse pressure gradients. *Journal of Visualization*, Volume 17.

Since beginning its CREST award in FY 2002, CUNY has teamed with diversity partners such as Lehman College and the CUNY Alliances for Graduate Education and the Professoriate (AGEP) and Louis Stokes Alliance for Minority Participation (LSAMP) projects, further expanding the research and educational opportunities for students in these networks.

Center for Applied Tropical Ecology and Conservation at the University of Puerto Rico



NSF Award: 0206200

Institution: University of Puerto Rico, Rio Piedras. PO Box 21489, San Juan, PR 00931

Contact: Elvira Cuevas, Department of Biology. Phone: (787) 764-0000 ext. 14713; fax: (787) 773-1722; e-mail: ecuevas@uprrp.edu

Internet: <http://crest-catec.hpcf.upr.edu>

The Center is designed to create a research environment where multidisciplinary groups work together to solve the complex environmental problems facing the tropics, with particular emphasis in the Caribbean.

The CREST Center for Applied Tropical Ecology and Conservation (CATEC) at the University of Puerto Rico, Rio Piedras focuses on four levels of biological organization: individuals and their genes, populations, ecosystems and landscapes. The Center promotes research programs in the particular areas of: Molecular Ecology, Evolution and Genetics; Species Population Management; Landscape Ecology; and Ecosystem Processes with the goal of training a new generation of scientists in applied ecology and conservation, and to better integrate university research activities with societal needs. The Center is designed to create a research environment where multidisciplinary groups work together to solve the complex environmental problems facing the tropics, with particular emphasis in the Caribbean. In 2005 alone, CATEC generated 31 publications, 18 research presentations, 6 collaborative projects; 3 activities and garnered 14 proposals and awards among 14 faculty and 71 students. CATEC graduate students have benefited from research experiences at partner locations including Duke University, North Carolina State University, the Smithsonian Tropical Institute, and the Universidad Nacional de Colombia-Medellin (Medellin, Colombia).

Selected Publications

Bayman, P, EJ Gonzales, JJ Fumero and R Tremblay. 2003. Are fungi really necessary? How fungicides affect growth and survival of the orchid, *Lepanthes rupestris*, in the field. *Journal of Ecology*, Volume 90.

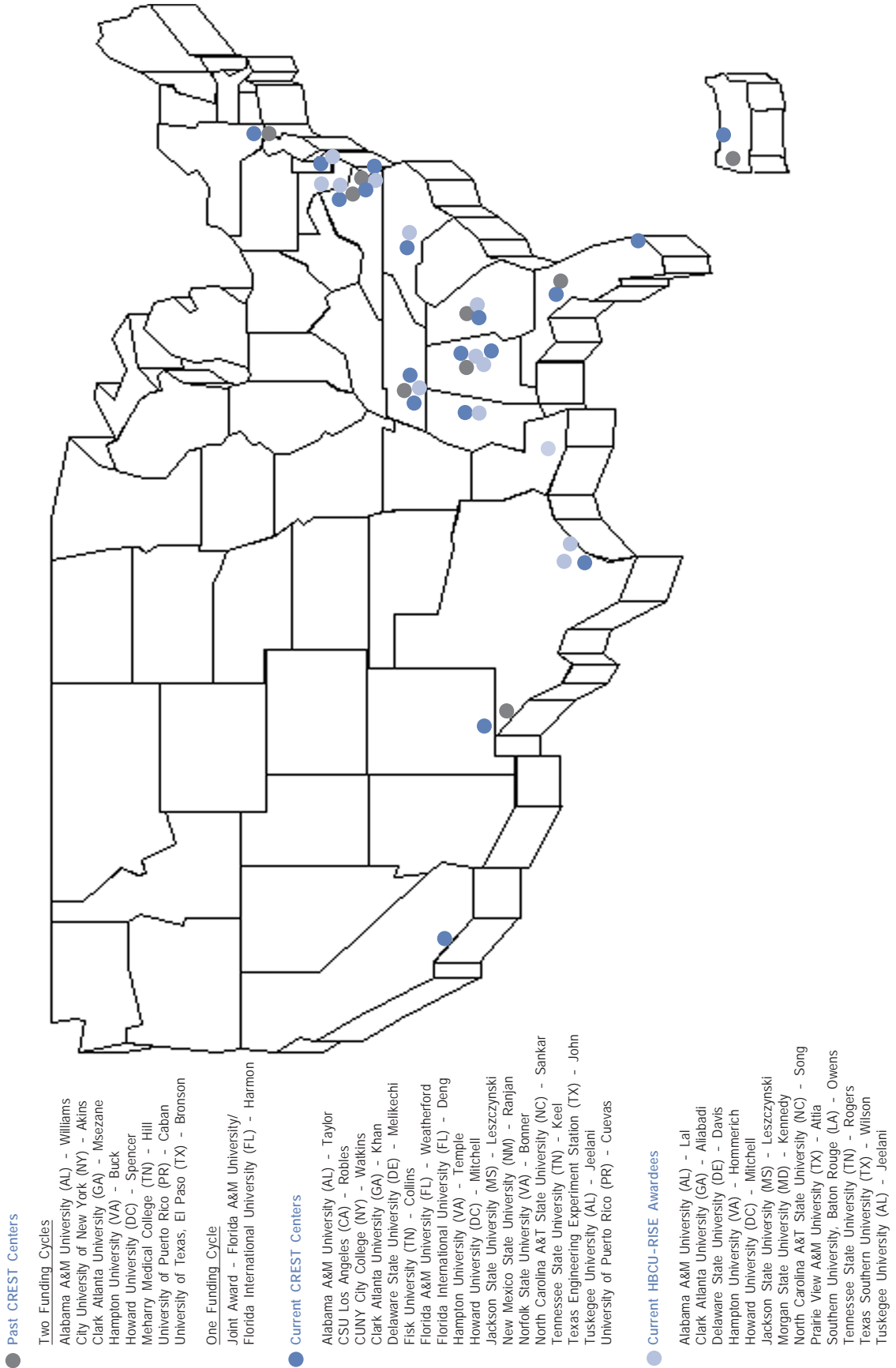
Melendez-Ackerman, E, C Calisto-Perez, M Morales-Vargas and J Fumero-Caban. 2003. Post-hurricane recovery of a herbaceous understory plant in a tropical rain forest in Puerto Rico. *Journal of Tropical Ecology*. Volume 19.

Santiago-Valentin, E and S Aragon. 2003. Phylogenetics of the Antillean Goetzeoideae (Solanaceae) and their relationships within the Solanaceae based on chloroplast and ITS DNA sequence data. *Systematic Botany*, Volume 28: 452-460.

Soucy, S, T Giray and D Roubik. 2003. Solitary and group nesting in the orchid bee, *Euglossa hyacinthine*. *Insects Sociaux*, Volume 50.



Map of CREST Centers and HBCU-RISE Awards



● **Past CREST Centers**

- Two Funding Cycles
- Alabama A&M University (AL) - Williams
- City University of New York (NY) - Akins
- Clark Atlanta University (GA) - Msezane
- Hampton University (VA) - Buck
- Howard University (DC) - Spencer
- Meharry Medical College (TN) - Hill
- University of Puerto Rico (PR) - Caban
- University of Texas, El Paso (TX) - Bronson
- One Funding Cycle
- Joint Award - Florida A&M University/
Florida International University (FL) - Harmon

● **Current CREST Centers**

- Alabama A&M University (AL) - Taylor
- CSU Los Angeles (CA) - Robles
- CUNY City College (NY) - Watkins
- Clark Atlanta University (GA) - Khan
- Delaware State University (DE) - Melikachi
- Fisk University (TN) - Collins
- Florida A&M University (FL) - Weatherford
- Florida International University (FL) - Deng
- Hampton University (VA) - Temple
- Howard University (DC) - Mitchell
- Jackson State University (MS) - Leszczynski
- New Mexico State University (NM) - Ranjan
- Norfolk State University (VA) - Bonner
- North Carolina A&T State University (NC) - Sankar
- Tennessee State University (TN) - Keel
- Texas Engineering Experiment Station (TX) - John
- Tuskegee University (AL) - Jeehani
- University of Puerto Rico (PR) - Cuevas

● **Current HBCU-RISE Awardees**

- Alabama A&M University (AL) - Lal
- Clark Atlanta University (GA) - Allabadi
- Delaware State University (DE) - Davis
- Hampton University (VA) - Hommerich
- Howard University (DC) - Mitchell
- Jackson State University (MS) - Leszczynski
- Morgan State University (MD) - Kennedy
- North Carolina A&T State University (NC) - Song
- Prairie View A&M University (TX) - Atia
- Southern University, Baton Rouge (LA) - Owens
- Tennessee State University (TN) - Rogers
- Texas Southern University (TX) - Wilson
- Tuskegee University (AL) - Jeehani

Table 1: Graduated and Current CREST Awards

Graduated Center Awards	
Materials Science Research Center of Excellence Howard University - 8714767 & 9255378	Michael Spencer
Meharry Medical College Research Center of Excellence in Membrane Biology Meharry Medical College - 8714805 & 9255157	George Hill
Puerto Rico Center of Excellence in Tropical and Caribbean Research University of Puerto Rico - 8802961 & 9353549	Reinaldo Caban
Center for Analysis of Structures and Interfaces (CASI) City University of New York - 8802964 & 9353488	Daniel Akins
Center of Excellence in Nonlinear Optics and Nonlinear Optical Materials Alabama A&M University - 8802971 & 9353548	Alton Williams
Materials Research Center of Excellence University of Texas, El Paso - 8802973 & 9353547	Arturo Bronson
Center for Theoretical Studies of Physical Systems Clark Atlanta University - 9154077 & 9632844	Alfred Msezane
Nuclear/High Energy Physics (NuHEP) Research Center of Excellence Hampton University - 9154080 & 9633750	Cynthia Keppel
Current Center Awards	
Center for Systems Science Research Tennessee State University - 9706268 & 0206028	Leehyun Keel
Center for Advanced Materials and Smart Structures North Carolina A&T State University - 9706680 & 0205803	Jagannathan Sankar
Synthesis, Manufacturing and Characterization of Structural Nanocomposites Tuskegee University - 9706871 & 0317741	Shaik Jeelani
Center for Photonic Materials Research Norfolk State University - 9805059 & 0317722	Carl Bonner
Computational Center for Molecular Structure and Interactions Jackson State University - 9805465 & 0318519	Jerzy Leszczynski
Center for Environmental Analysis (CEA-CREST) California State University, Los Angeles - 9805529 & 0317772	Carlos Robles
Center for Mesoscopic Modeling and Simulation City University of New York City College - 0206162	Charles Watkins
Center for Applied Tropical Ecology and Conservation at the University of Puerto Rico University of Puerto Rico, Rio Piedras - 0206200	Elvira Cuevas
Research on the Environmental Sustainability of Semi-Arid Coastal Areas (RESSACA) Texas A&M University, Kingsville - 0206259	Kuruvilla John
Center for Nanomaterials Characterization and Processing Technology Howard University - 0317607	James Mitchell
Center for Emerging Technologies for Advanced Information Processing and High-Confidence Systems Florida International University - 0317692	Yi Deng
Center for Research Excellence in Bioinformatics and Computational Biology New Mexico State University - 0420407	Desh Ranjan
Center for Excellence in Physics and Chemistry of Materials Fisk University - 0420516	Warren Collins
Center for Forest Ecosystems Assessment Alabama A&M University - 0420541	Robert Taylor
Center for Astrophysical Science and Technology Florida A & M University - 0630270	Charles Weatherford
Center for Laser Science and Spectroscopy (CLASS) Hampton University - 0630372	Doyle Temple
Center for Research and Education in Optical Sciences and Applications Delaware State University - 0630388	Nouriddine Melikechi
Center for Functional Nanoscale Materials Clark Atlanta University - 0630456	Ishrat Khan



Research on the Environmental Sustainability of Semi-Arid Coastal Areas (RESSACA)

NSF Award: 0206259

Institution: Texas A&M University, Kingsville. Frank H. Dotterweich College of Engineering, Kingsville, TX 78363

Contact: Dr. Kuruvilla John. Frank H. Dotterweich College of Engineering, MSC 213. Phone: (361) 593-2290; fax: (361) 593-2069; e-mail: k-john@tamuk.edu

Internet: <http://crest.tamuk.edu/>

Texas A&M University, Kingsville (TAMUK) is the lead institution for the Research on Environmental Sustainability of Semi-Arid Coastal Areas (RESSACA) project. The Center's principal research areas are: Environmental Systems Modeling (ESM), Environmental Informatics (EI), and Living Laboratories for Academics and Research (LLAR). The LLAR, in particular, provides multi-scale integrated academic and research field facilities for environmental assessment in semi-arid coastal zones within South

Texas. The data generated are utilized in ESM and EI applications and are transferred into educational domains from kindergarten through graduate school and to the general public. RESSACA provides a forum for minority student enrollment in graduate-level disciplines pertaining to environmental engineering, the integration of research and education, and the translation of environmental research to public policy and economic development. To date, RESSACA has funded 45 students including 9 Ph.D., 10 MS, and 26 undergraduate students; in 2006 the project's began graduating its first cohort of Ph.D.s in Environmental Engineering as TAMUK has become a major producer of Hispanic students in this field.

RESSACA provides a forum for minority student enrollment in graduate-level disciplines pertaining to environmental engineering, the integration of research and education, and the translation of environmental research to public policy and economic development.

Selected Publications

Chang, N-B. 2003. Compatibility analysis of material and energy recovery in a regional solid waste management system (Year 1). *Journal of the Air and Waste Management Association*, Volume 53.

Clapp, L. 2004. Evaluation of polyethylene hollow-fiber membranes for hydrogen delivery to support reductive dechlorination in a soil column (Years 1 & 2). *Water Research*, Volume 37.

Jones, K and A Martinez. 2004. Kinetic evaluation of H₂S and NH₃ biofiltration for two media used for wastewater life station emissions (Year 2). *Journal of the Air and Waste Management Association*, Volume 54.

RESSACA is an interdisciplinary research center that supports partnerships with education, research, government and private entities to conduct and disseminate research findings. Partner institutions include: Texas A&M University, Corpus Christi; Texas A&M International University, Laredo; The University of Texas, El Paso; The University of Texas, Pan American; The University of Texas, Brownsville; the University of Arizona; the San Diego Supercomputer Center; and CREST projects in Alabama, California, and Puerto Rico.



Center for Nanomaterials
Characterization Science and Processing Technology

NSF Award: 0317607

Institution: Howard University. 2400 Sixth Street, NW, Washington, DC 20059

Contact: James W. Mitchell, Department of Materials Science. Phone (202) 806-4394; fax: (202) 806-5367;
e-mail: jwm@msrce.howard.edu

Internet: <http://hucrest.howard.edu>

The Center's discoveries and development of new tools provide increased exposure to research and educational opportunities for minority students, particularly in the fundamental aspects of Materials Chemistry.

Howard University's CREST Center for Nanomaterials Characterization Science and Processing Technology (NCSPT) focuses on the verification of directed synthesis and development of methods for fabricating new nanomaterials with clearly definable chemical identities and technologically useful properties. Characterization research clarifies the unexpected chemical transformations that nanomaterials undergo during the generation of nanostructured devices. The Center's

discoveries and development of new tools provide increased exposure to research and educational opportunities for minority students, particularly in the fundamental aspects of Materials Chemistry.

Four courses derived from NCSPT's research have been initiated at Howard. These include Frontiers in Nanosciences Research and Engineering, which introduces a variety of majors to nanotechnology, and Computational Methods in Chemistry, which is taught to chemistry and mechanical engineering students. Additionally, NCSPT faculty partnerships have been forged with the National Institute of Standards and Technology (NIST), the Naval Research Lab, Johns Hopkins University, NASA Goddard Institute for Space Studies, the University of Maryland College Park, the University of Michigan Ann Arbor, Michigan State University, Bluewave Semiconductor, The University of Texas at El Paso, Boeing Corporation, Princeton University, and the Army Research Lab.

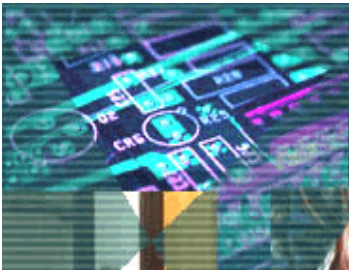


Selected Publications

Baruah, T, RR Zope, SL Stevenson and MR Pederson. 2004. Electronic structure, vibrational stability, and predicted infrared-Raman spectra of the As clusters. *Journal of Chemical Physics*, Volume 121.

Harris, G and L Salamanca-Riba. 2003. Systematic study of effects of growth conditions on the size and shape of GaN single crystals grown by a direct reaction of Ga with ammonia. *Journal of Applied Physics*, Volume 94.

Mitchell, J. 2004. Stability of silver nanoparticles in aqueous and organic media. NNIN REU Research Accomplishments Conference Proceedings, Volume 8.



Center of Emerging Technologies for Advanced Information Processing and High-Confidence Systems

NSF Award: 0317692

Institution: Florida International University, Miami, FL 33199

Contact: Yi Deng, School of Computer Science. Phone: (305) 348-1229; fax (305) 348-3549; e-mail: deng@cs.fiu.edu

Internet: <http://www.crest.fiu.edu>

The Center of Emerging Technologies for Advanced Information Processing and High-Confidence Systems, or "ETECH," is managed jointly by the School of Computer Science and the Department of Electrical and Computer Engineering at Florida International University (FIU). By applying a robust and powerful computing capability, ETECH combines four distinct but related research areas, including: 1. high-performance mapping and data modeling; 2. high-confidence, reactive software systems; 3. real-time assistive technologies for persons with visual impairments, blindness or motor disabilities; and 4. information processing of signal and imaging techniques in neuroscience. Real-world applications of this project portfolio are as diverse as: improved diagnosis and understanding of epilepsy and autism, high-resolution mapping and data modeling, disaster modeling and mitigation, homeland security and improved real-time visual, spatial and audio navigation for persons with disabilities. A cornerstone of these efforts is TerraFly (www.terrafly.com), an Internet browser-based geographical information application with a capacity of more than 30 billion data overlays.

The FIU Center serves as a resource for the education of students underrepresented in STEM and is a gateway to research and education opportunities in Latin and South America.

ETECH's mission is to become a leading center of education and research in advanced information processing and high-confidence systems through integration of emerging technologies with real-world applications and significant societal impact. So far this work has inspired 180 research papers, 3 patents and 5 graduate-level courses based on such work, 11 Ph.D. graduates and a number of joint faculty appointments. FIU also hosts an annual Engineering Gala, attended by 1,000 to 1,500 invited high-school students, an initiative that is paying dividends in increased enrollment and retention.

The FIU Center also serves as a resource for the education of students underrepresented in STEM and is a gateway to research and education opportunities in Latin and South America. ETECH now produces some 20 percent of the nation's computer science Ph.D.s among Hispanic students. As a major partner of the Latin American Grid project, FIU students work collaboratively with 1,000 networked machines in Spain, Mexico, and Argentina. FIU students are also involved in mentoring programs and internships with IBM executives in the United States. In Florida, ETECH has fostered partnerships with Miami Children's Hospital and others in conducting innovative biomedical research and the development of assistive technology.

Center for Research Excellence in Bioinformatics and Computational Biology



NSF Award: 0420407

Institution: New Mexico State University. Las Cruces, NM 88003

Contact: Desh Ranjan, Department of Computer Science. Phone: (505) 646-4600; fax: (505) 646-1002;
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Internet: <http://www.nmsu.edu>

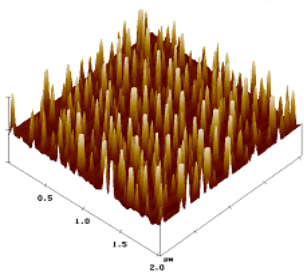
NMSU is among the first minority-serving institutions with a research center for Bioinformatics and has the first such program in New Mexico.

The Center for Bioinformatics and Computational Biology (BCB) at New Mexico State University (NMSU) is dedicated to the discovery of information technology to facilitate the understanding of biological processes. Its areas of focus include the extraction of knowledge from complex biological sources, computational methods to

improve protein structure prediction, and the determination of functionally important parts of genomes. The Center combines the complementary expertise of a team of researchers from Computer Science, Biology, Chemistry, and Agriculture to advance the state of the art in BCB. It also integrates cutting-edge research in BCB with the creation of educational opportunities for a diverse body of students and researchers. The educational effort provides new research-oriented courses and training, and culminates with the development of a master's degree in BCB as well as outreach efforts targeting local high schools and community colleges. The Center also supports specific research projects and activities aimed at developing a general infrastructure for research and education in BCB.

NMSU is one of the few minority, Hispanic-serving, research-extensive institutions with comprehensive science, technology and engineering programs. With this CREST award, NMSU is among the first minority-serving institutions with a research center for Bioinformatics and has the first such program in New Mexico. The Center greatly boosts the BCB research and educational activities at NMSU, acting as a catalyst for the creation of a comprehensive BCB program. It provides educational and training opportunities for students from high school to graduate school and from diverse backgrounds, increasing the access to careers in BCB by underserved populations. The proposed research also has the potential to impact disciplines such as medicine and agriculture, expanding the broader societal benefits of the Center's work.

The NMSU CREST serves a diverse student population with a large proportion of Native Americans and Hispanics. The NMSU Center builds on the existing infrastructure to enhance minority participation in science and technology and extends its impact by providing access to academic excellence in BCB. NMSU programs such as Native American Pathways, the National Institutes of Health Bridge in Biomedical Sciences, the NMSU National Institute of General Medical Sciences' Minority Access to Research Careers program, and the NSF-funded NM-AMP, NM-ADVANCE and NM-AGEP programs have also committed their support to the development of the BCB Center at NMSU.



Center for Excellence in Physics and Chemistry of Materials at Fisk University

NSF Award: 0420516

Institution: Fisk University, 1000 Seventeenth Avenue North, Nashville, TN 37208

Contact: E. Warren Collins, Physics Department. Phone: (615) 329-8664; fax (615) 329-8634;
e-mail: ecollins@fisk.edu

Internet: <http://www.fisk.edu>

The Center for Excellence in Physics and Chemistry of Materials (CPCoM) at Fisk University integrates high-quality science education with state-of-the-art research in the areas of: preparation of amorphous materials; crystal growth of optical materials; preparation of nanophase materials; thin-film deposition; surface characterization; linear and non-linear optics; laser spectroscopy; and the fabrication and implementation of materials in sensors, devices and subsystems. Over the course of CREST support, it is hoped that CPCoM will develop into an internationally recognized research center.

Fisk University and its partners are committed to increasing the number of scientists from historically under-represented populations in order to provide a diverse group of graduate practitioners in STEM.

Education of undergraduates and graduates is a vital component of the Center. Fisk University and its partners are committed to increasing the number of scientists from historically underrepresented populations in order to provide a diverse group of graduate practitioners in STEM. Student research experiences at CPCoM will include laboratory experimentation and modeling. Undergraduate students supported by the Center are encouraged to participate in summer research experiences at Fisk, national laboratories, industry facilities and other universities, including participation in summer semesters at doctorate-granting institutions. The project extends its outreach activities to high schools in Nashville and to HBCUs in Tennessee and neighboring states. Agreements made with Vanderbilt University and Carnegie Mellon University provide Fisk CPCoM project graduates with opportunities beyond the master's degree as Fisk builds the academic foundation and intellectual climate to develop a quality Ph.D. program of its own.





Center for Forest Ecosystems Assessment

Award: 0420541

Institution: Alabama A&M University. 135 Agricultural Research Center, Normal, AL 35762

Contact: Robert Taylor, School of Agriculture and Environmental Science. Phone: (256) 372-4178; fax: (256) 372-5429; e-mail: rwTaylor@aamu.edu

Internet: <http://www.aamu.edu>

The intellectual benefits of CFEA will be shared with the greater community of scholars, students and practitioners of natural resource science and policy.

With its FY 2004 CREST award, Alabama A&M University (AAMU) has established a Center for Forest Ecosystems Assessment (CFEA). The Center will contribute to the knowledge of forest ecosystems by in-depth analysis of additive and confounding effects of anthropogenic and natural interventions. Ecological relationships will be examined at different temporal and geographical scales.

The study of biogeochemical cycling characterizes the impact of fire on microbes on soils and focuses on the contributions that nitrogen-cycling microbial communities make to the succession of herbaceous and woody plants. The project's research activities will also be used to enhance the understanding of upland hardwood forest ecosystem responses to disturbances.

The outcomes of CFEA will be shared with the greater community of scholars, students and practitioners of natural resource science and policy. The approaches utilized in CFEA will aid others, especially those at smaller minority-serving institutions, in developing programs and capacities in ecological research. The ultimate goals include the improved understanding of forest ecosystems, and an increase in the number of trained professionals, especially African Americans, engaged in the research, teaching and management of renewable natural resources.

CFEA activities also include an enhanced research base, enhanced graduate student training, curricula and faculty development, and the development of research facilities and resources. Undergraduate, graduate and post-doctoral students are at the core of each research team. They are supported by a network of technical staff, faculty and external experts, including adjunct faculty, advisors and collaborators. Center research and related information is made available through the project office, the annual CFEA conference, and outreach to communities, high schools, community colleges and HBCUs with an interest in the monitoring of renewable natural resources. Faculty-development strategies encourage production of refereed journal articles, new or revised graduate courses, and student recruitment and matriculation. Collaboration with external partners and solicitation of extramural support is also part of the CFEA plan.



Center for Astrophysical Science and Technology

NSF Award: 0630370

Institution: Florida A&M University, 400 Foote Hilyer Administration Bldg., Tallahassee, FL 32307

Contact: Charles A. Weatherford, Department of Physics. Phone: (850) 599-3767; fax (850) 599-3953;
e-mail: weatherf@cepast.famu.edu

Internet: <http://www.famu.edu>

Researchers at the Florida A&M University (FAMU) CREST Center for Astrophysical Science and Technology (CCAST) will experimentally and theoretically examine ionization and charge-exchange collisions between electrons, ions, atoms and molecules and will analyze data from the Chandra X-ray Observatory (CXO). A second project will study the role of turbulence physics in astrophysical processes, while a third project will develop detector instrumentation for Astrophysics.

CCAST's focus in astrophysical sciences is unique among the nation's minority-serving institutions. Accordingly, the Center will provide unparalleled education, research and career-development opportunities for students and faculty.

CCAST's focus in astrophysical sciences is unique among the nation's minority-serving institutions. A cadre of accomplished researchers, combined with a recently initiated doctoral program in Physics, provides a promising foundation for CCAST. The education and matriculation of minority Ph.D. students in Astrophysics and related fields is a central goal of the Center. The proposed work includes the establishment of a laboratory Astrophysics program, which will include both undergraduate and graduate components via a new undergraduate minor and doctoral-level research opportunities. Also consistent with the goals of the CREST mission will be an enhancement in faculty productivity, the generation of new knowledge, student recruitment and retention and the integration of education and research. Over the project's initial 5-year period of support, FAMU hopes to produce 15 African-American Ph.D.s in Astrophysics and Astrochemistry, with the latter assisted by the creation of a doctoral-level Chemistry program at FAMU. CCAST aspires to provide unparalleled education, research and career-development opportunities for students and faculty in this field. Enrollment at FAMU is approximately 90 percent African American. Establishing CCAST will build FAMU's existing research capacity while attracting national and international researchers to the campus and drawing more minority students to STEM fields. Planned CCAST outputs include a publicly available Internet database of atomic collision cross sections, a newsletter and research seminars.

CCAST will work cooperatively with its partner facilities, including Florida's Center for Plasma Science and Technology (CePAST), the electron-beam ion trap (EBIT) facility at the University of California's Lawrence Livermore National Laboratory (LLNL), the Smithsonian Astrophysical Observatory at Harvard University, and Goddard Space Flight Center in Greenbelt, Maryland.

Center for Laser Science and Spectroscopy (CLaSS)



NSF Award: 0630372

Institution: Hampton University. E. Queen and Tyler St., Hampton, VA 23668

Contact: Doyle A. Temple, Department of Physics. Phone: (757) 728-6908; fax (757) 728-6910;
e-mail: doyle.temple@hamptonu.edu

Internet: <http://www.hamptonu.edu>

CLaSS will be a multi-disciplinary effort that extends the campus' existing research capability and enhances the campus' talent pool in laser spectroscopy and related areas.

With its FY 2006 CREST award, Hampton University is developing its Center for Laser Science and Spectroscopy (CLaSS), a multidisciplinary effort that extends the campus' existing research capability and enhances its talent pool in laser spectroscopy and related areas. Specific research supported by CLaSS includes fluorescent spectroscopy and laser crystal development, nonlinear spectroscopy of

semiconducting nanocrystals, and laser remote sensing. Infrared solid-state lasers are of great interest for a number of applications including optical communications, remote sensing, free-space communications, and surgical procedures. The nonlinear properties of optical materials are also important for many applications, including optical sensor protection of lidar systems for the detection of bio-chemical agents and the development of compact laser systems. CLaSS's research on laser remote sensing will include making atmospheric measurements with an eyesafe scanning lidar system.

CLaSS is envisioned as a world-class research and education center and a national model for research infrastructure at a historically Black university. Hampton University is already known as one of the nation's leading producers of African Americans with Ph.D.s in Physics generally and in Optical Sciences in particular. In addition to developing new techniques and forging new knowledge in Laser Science, the production of minority Ph.D.s will be inherent in the CLaSS mission. Hampton expects to deliver hands-on research experience in Chemistry, Chemical Engineering and Physics; facilities; and access to faculty mentors and role models for its students. Opportunities will include participation in national and international conferences, internships with the Center's industrial partners, research seminars and tutelage in scientific writing and presentations.

The existing Hampton University lidar will be upgraded and its improved performance will be compared with the REAL (Raman-shifted Eyesafe Lidar) system through side-by-side measurements at the National Center for Atmospheric Research (NCAR). Analysis of aerosol measurements in the Virginia-Maryland area will be performed in close collaboration with researchers at the Hampton University Center for Atmospheric Sciences, NCAR, and NASA's Langley Research Center.



Center for Research and Education in Optical Sciences and Applications

NSF Award: 0630388

Institution: Delaware State University. 1200 N. Dupont Highway, Dover, DE 19901

Contact: Nouredine Melikechi, Applied Optics Center. Phone: (302) 857-6656; fax (302) 857-6657;
e-mail: melik@desu.edu

Internet: <http://www.creosa.desu.edu>

With its FY 2006 award, Delaware State University will establish the Center for Research and Education in Optical Sciences and Applications (CREOSA). The mission of the new venture is broad in scope, with applications in optical sciences bridging research projects in Physics, Chemistry, Engineering, Computer Science, Mathematics, and Biology. Specific research areas within CREOSA include: Applied Laser Spectroscopy, Data Mining, Optical Solitons and Bioimaging. The Center's focus on optical sciences is inherently multidisciplinary, fostering foundational experiences in research theory, methodology and the development of new knowledge in many STEM disciplines.

The Center's focus on optical sciences is inherently multidisciplinary, fostering foundational experiences in research theory, methodology and the development of new knowledge in many STEM disciplines.

CREOSA will build upon the university's research infrastructure by balancing faculty research efforts with the attraction, engagement and matriculation of STEM majors from Delaware State's diverse student population. As envisioned, CREOSA will also facilitate the ability of existing science and engineering departments to work collaboratively and productively. Finally, CREOSA will serve as a facilitator between the campus' research activities and the broader community, including other institutions of higher education, K-12 feeder schools, and the industrial R&D community in the state of Delaware.

CREOSA will build upon many extant facilities at Delaware State University and elsewhere, and will draw from a wealth of qualified personnel to help build the Center's reputation as a regional, national and international resource. The education plan for CREOSA is ambitious, weaving the Center's research activities into curricula from introductory coursework through graduate-level research and including a dual-mentoring approach. Center staff intend to participate in a comprehensive outreach plan incorporating K-12, undergraduate and graduate awareness of and attraction to optical science education and research opportunities. Among additional goals for the Center is to contribute to the efforts of the university to double the institution's production of STEM degrees within 10 years, develop a senior thesis option, and develop the framework for a Ph.D. program in optical sciences.

CREOSA will bring advanced, world-class research activity to a primarily teaching-intensive HBCU. It is hoped the results will help create an exciting foundation for further collaboration, discovery and institutional growth.

Center for Functional Nanoscale Materials



NSF Award: 0630456

Institution: Clark Atlanta University. 223 James P. Brawley Dr. SW, Atlanta, GA 30314

Contact: Ishrat Khan, Chemistry Department. Phone: (404) 880-6847; fax (404) 880-6849;
e-mail: ikhan@cau.edu

Internet: <http://www.cau.edu>

It is expected that the CAU center will significantly enhance the university's research capacity in nanotechnology while providing support for students, technical and administrative support for faculty, and enabling substantive upgrades to equipment.

The Center for Functional Nanoscale Materials at Clark Atlanta University (CAU) will combine theoretical and fundamental nanotechnology research within a multidisciplinary and interdisciplinary framework, then combine these discoveries with CAU's education experiences and existing or proposed new facilities. Specific research areas encompassed by the Center include the preparation and photocatalytic reactivities of nanostructured composites; the syntheses and

study of functionalized carbon nanotubes, nanoporous multifunctionalized organosilicates, and biofunctional nanoscale materials. Considered collectively, the specialized research projects within the CAU CREST will yield new knowledge and insights into the basis for synthesis and activity of nanomaterials with applications as diverse as electronics, corrosion inhibition, catalysis, disinfection of drinking water, decomposition of toxic compounds, and biosensors.

It is expected that the CAU Center will significantly enhance the university's research capacity in nanotechnology while providing support for students, technical and administrative support for faculty, and enabling substantive upgrades to equipment. for conducting the center's ambitious research and education plan. The Center will increase the number of minority STEM students retained and engaged as STEM majors by providing "nano-scholar" incentives for promising high-school students to enter the center's programs and by providing competitive financial assistance for graduate students. The CREST award will also enable CAU to increase its collaboration with other ventures, as supported by NSF and other sources. It is especially hoped that the continued active involvement of undergraduate students in such enticing ventures throughout their course of study and via summer internships will retain more minority STEM majors and lead to more doctoral graduates and career professionals in nanoscience. For some, their journey will begin with the new Water and Materials Chemistry program for high-school students and teachers, as well as post-freshman academic consolidation and enhancement (PACE) programs.

Project collaborators for the CAU CREST include Emory University, Cornell University, the University of Illinois at Urbana-Champaign, and federal laboratories including NASA Glenn, NASA Langley, Oak Ridge National Laboratory, and the Naval Research Laboratory.

HBCU-RISE

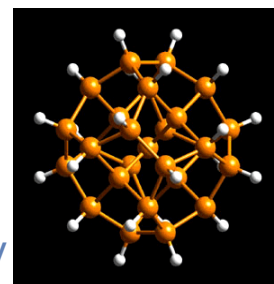


Historically Black Colleges and Universities - Research Infrastructure for Science and Engineering (HBCU-RISE), formerly known as HBCU Doctoral Capacity Building, is a related activity incorporated into the CREST portfolio of projects. HBCU-RISE supports the development of research capability at HBCUs that offer doctoral degrees in STEM disciplines. Activities include, but are not limited to: faculty and technical support, faculty professional development, acquisition and/or upgrading of research equipment, and collaborative research efforts with partner universities and national laboratories. In many ways, HBCU-RISE awardees represent the next generation of minority-serving institutions that will have a strong capacity for world-class research and the production of quality STEM graduates. Although CREST began making provisional HBCU-RISE awards in FY 2002, the first full HBCU-RISE competition was not held until FY 2003. To date, 13 institutions have received HBCU-RISE funds. These awards are summarized in Table 2 below. For more information on a particular award, visit NSF's online Abstracts at: <http://www.nsf.gov/awardsearch/> and search by the project award number.

Table 2: HBCU-RISE Awardees, FY 2002 - 2006

Doctoral Research Capacity Building for Sensor Science Technology Alabama A&M University - 0236425	Ravindra Lal
Infrastructure Building to Develop a Center for Biological and Chemical Sensor Research Morgan State University - 0236753 & 0627276	Alvin Kennedy
Building Research Capacity and Increasing Doctoral Successes for Underrepresented Minority Students Tennessee State University - 0236793	Decatur Rogers
Infrastructure Support for Doctoral Research in Optics & Photonics Hampton University - 0400041	Uwe Hommerich
Chemical and Biological Assessment of Endocrine Disruptors in Waterways of Southeast Texas Texas Southern University - 0401587	Bobby Wilson
Research and Education in Advanced Computing (REACOM) Clark Atlanta University - 0401679	Shahrouz Aliabadi
Computational Biology Howard University - 0401697	Louis Shapiro
Studies of Structural Nanocomposites Using Transmission Electron Microscopy Tuskegee University - 0401724 & 0627272	Shaik Jeelani
Synthesis, Characterization, and Computational Study of Potential Antibiotic/Antitumor Spiroisoxazolines Jackson State University - 0401730	Jerzy Leszczynski
Biologically-Inspired Adaptive and Reconfigurable Systems: Modeling, Synthesis, and Simulation North Carolina A&T State University - 0450203	Yong D. Song
Enhancement of Doctoral Research Capacity in Environmental Toxicology Southern University, Baton Rouge - 0450375	John Owens
Modeling and Testing of Advanced Mixed Signal Systems Prairie View A&M University - 0531507	John Attia
A Dual-Degree Graduate Program to Build HBCU Infrastructure Delaware State University - 0531508	Leonard Davis

HBCU-RISE Principal Investigator Directory



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