

2011

FY 2011 Division of Research Annual Report

Division of Research, Florida International University

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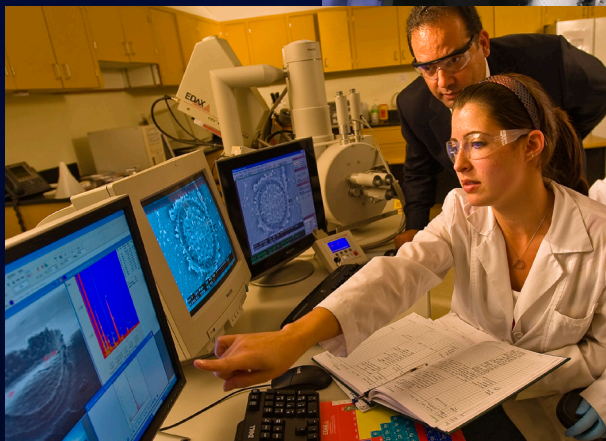
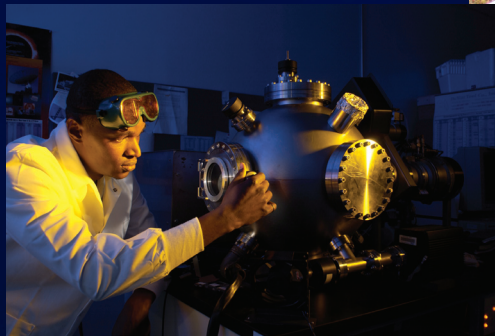
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FY2011

DIVISION OF RESEARCH

ANNUAL REPORT



On the cover: Biological Sciences professor Evelyn Gaiser and colleagues are among dozens of FIU scientists conducting Everglades research. **This page, from top:** Ranu Jung, chair of Biomedical Engineering; Biological Sciences professor Steve Oberbauer; FIU undergraduate student researcher; Jose Almirall, director of International Forensic Research Institute and Yisseny Delgado.



Mark B. Rosenberg
President, Florida International University

As South Florida's only public research university, we are proud of our record of service to the South Florida community and to our students. Our 2010-2015 Worlds Ahead strategic plan calls for us to build on our faculty's research and creative energies to form a strong foundation for competitiveness in the twenty-first century knowledge economy, and to engage with local and global communities in collaborative problem solving.

Our strategic plan seeks to increase research expenditures by 36 percent from 2010 to 2015. Even in these tough economic times, we are well on our way to achieving this goal, with research awards increasing by 17.8 percent from FY 2009 (\$88.8M) to FY 2011 (\$104.6M). The research and creative activities of our faculty are generating results and creative contributions that are being recognized both nationally and internationally.

As a Carnegie-classified Engaged University, our faculty produces research that is linked to local economic development and problem solving. Research provides high-skill, high-wage jobs for Americans. As an urban research university, we are committed to investing now to foster the next generation of scientists and innovation, which will be the key to global competitiveness, new and better jobs, a resilient economy, and the attainment of essential national goals.



Andrés G. Gil
Vice President for Research

During fiscal year 2011, FIU continued its long-term research growth. FIU scholars received \$104.6 million in research awards during FY 2011. This amount represents a 4 percent increase from the previous fiscal year. Within the context of increasingly competitive research funding and shrinking budgets for state and federal agencies, FY 2011 marked the third consecutive year of increases in research awards obtained by FIU faculty, and the second consecutive year with awards exceeding \$100 million.

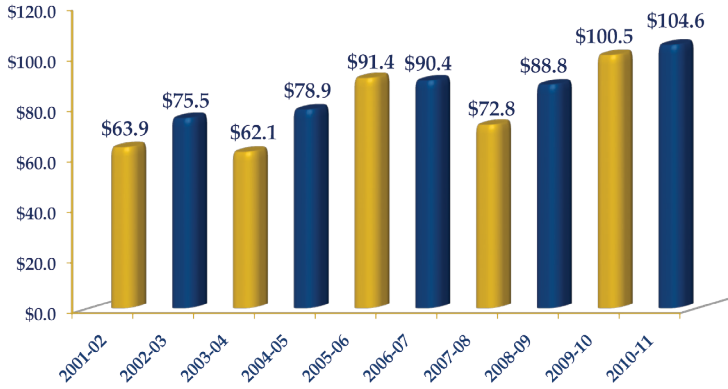
Through these grants, the university was able to create more than 500 jobs for professionals other than faculty, and more than 200 jobs for graduate and/or undergraduate students.

FIU's growth in research productivity has received national recognition. In May 2011, *The Chronicle of Higher Education* featured FIU as an example of a university with a research growth strategy that has succeeded where many others have not. Just three months later, this same publication reported that FIU ranks #11 in the U.S. in gains in federal funds (adjusted for inflation) for research and development in science and engineering between 1999 and 2009, with a growth of 163.9 percent.

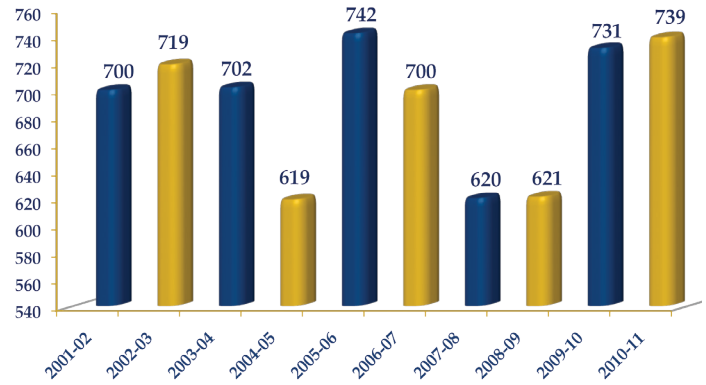
Our faculty continues to conduct cutting-edge research in applied and basic sciences, and engage in significant creative activities in the arts and humanities. We will continue to build interdisciplinary teams of researchers whose research will impact social and economic development and whose research will expand the frontiers of science. To accomplish this, we are committed to providing state-of-the-art facilities and enhancing undergraduate and graduate student research opportunities.

BY THE NUMBERS

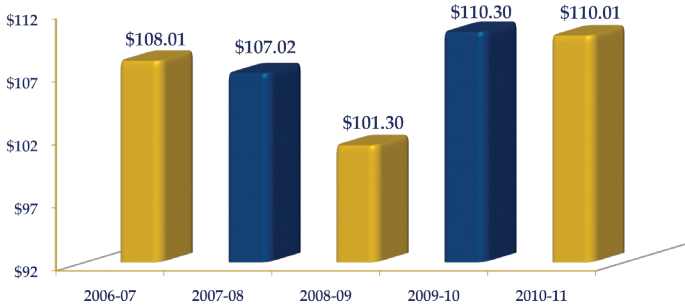
10-Year History of Research Awards in Millions



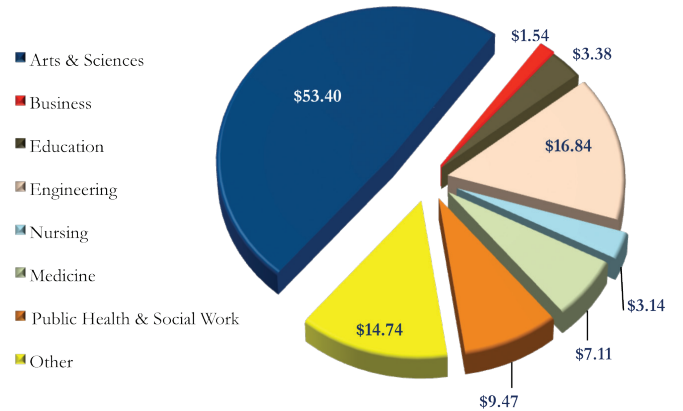
10-Year History of Number of Awards Received



Five-Year History of Research Expenditures in Millions



2010-2011 Research Awards by Unit in Millions



Note: The figures above total \$109.6M instead of \$104.6M. The difference is due to credit across units given for multidisciplinary projects.

Included in Academic Affairs and Arts & Sciences	\$0.7M
Included in Academic Affairs and Business	\$0.5M
Included in Academic Affairs and Engineering	\$1.0M
Included in Academic Affairs and Public Health & Social Work	\$0.8M
Included in Arts & Sciences and Medicine	\$2.0M
TOTAL	\$5.0 M

RESEARCH HIGHLIGHTS



BUILDING SAFER STRUCTURES – Research conducted at the International Hurricane Research Center’s Wall of Wind (WoW), led by Professor Arindam Chowdhury’s team, resulted in changes to the 2010 Florida Building Code, which will go into effect March 15, 2012. These new code provisions are geared toward decreasing the vulnerability of roofs caused by failure of roof-top equipment during hurricanes. The hurricanes of the 2004 and 2005 seasons showed that rooftop equipment was the most vulnerable, causing extensive roof damage and generating flying debris.

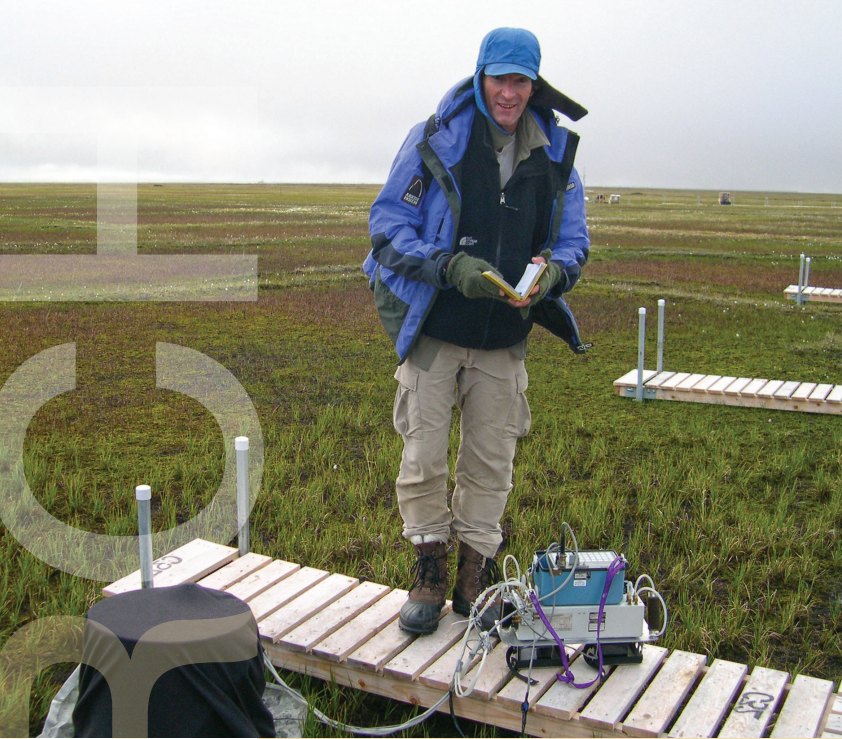
TREATING NEUROGENERATIVE AND ALCOHOL-USE DISORDERS – Findings derived from the work of Dr. Madhavan Nair and his team in the Herbert Wertheim College of Medicine indicate histone deacetylase inhibitors (HDACS) play an important role in the development of alcohol use disorders and may have a role in the treatment of such disorders. HDACS are also being studied for their prevention and treatment of neurodegenerative disorders. The team’s work was presented at the National Institute on Drug Abuse (NIDA).

NEW TREATMENTS FOR PROSTATE CANCER – Researchers at the Herbert Wertheim College of Medicine, led by the teams of Professors Irina and Alexander Agoulnik, found that targeting the cell surface receptor for relaxin peptide produced in prostate cancer cells reduced tumor growth and metastases of this disease. In one published study, silencing receptor expression was achieved

through the delivery of specific inhibitors of receptor production within the cells (siRNA) on biodegradable nanoparticles. Results of these studies were published in several journals this year, including *Cancer Research*, the *World Journal of Urology* and *Endocrine-Related Cancer*.

EVERGLADES – The Florida Coastal Everglades Long-Term Ecological Research (FCE LTER) program received a \$366,000 grant from the National Park Service to evaluate ecosystem consequences of the first completed restoration project to restore water flow to the southern Everglades via a 1-mile bridge on the Tamiami Trail. It also received \$158,000 from the National Science Foundation (NSF) to develop an automated communication system that provides “real time” visualization of ecosystem status and trends for scientists and the public. NSF funding for the FCE LTER Schoolyard program has supported ecological science curriculum development for three high school teachers this year, reaching more than 500 high school students on a daily basis. High school students participating in FIU research have been awarded more than \$45,000 in college scholarships this year. One of these students, Chris Sanchez of Felix Varela High School, had a planet named in his honor by placing first in Botanical Sciences at the International Science and Engineering Fair.





CLIMATE CHANGE RESEARCH – Professor Steve Oberbauer, Department of Biological Sciences, and colleagues published a study showing that tundra vegetation exhibits strong regional variation in response to warming, and that in vulnerable regions, cumulative effects of long-term warming on tundra vegetation – and associated ecosystem consequences – have the potential to be much greater than we have observed to date.

RISE UP – The MBRS RISE program is sponsored by a National Institutes of Health annual \$1 million grant. The program seeks to increase the number of students from underrepresented groups in biomedical and behavioral research who enter into and successfully complete Ph.D. programs in these fields. In FY 2011, the RISE program had seven B.S. graduates, two M.S. graduates and three Ph.D. graduates. RISE students had authorship in 19 peer-reviewed publications, including first-author honors in six. Additionally, RISE students made 57 presentations at national and international meetings. During the past 12 years, the RISE program has graduated 137 students. Fifty-seven percent of the students have gone on to receive doctoral degrees, including 4 percent receiving medical degrees. Twelve of the graduates are tenure-track faculty in universities from throughout the U.S., 19 are employed in industry, another 19 have academic research positions, and another 11 are currently in post-doctoral research positions throughout the U.S.

NEW APPROACHES TO ADHD TREATMENT –

Professors James Waxmonsky and William Pelham (Center for Children and Families) published two articles in the *Journal of Clinical Psychiatry* on new treatments of ADHD. The initial article was on the first clinical trial ever to combine non-stimulant medication for ADHD with behavioral treatments. In it, the authors reported that combined treatment led to additional benefits at home versus medications alone. The second article was the first published analysis of placebo effects in adult ADHD trials.

“THE EDUCATION EFFECT” – Through a generous \$1 million donation by JPMorgan Chase, FIU and Miami-Dade County Public Schools, the nation’s fourth largest school district, have established the first “university-assisted community school.” The program utilizes service learning to link FIU courses and research with real-world problem solving. Faculty and students from environmental sciences, education and business are working with Miami Northwestern High School teachers, students and parents to ensure a successful transformation at Northwestern.



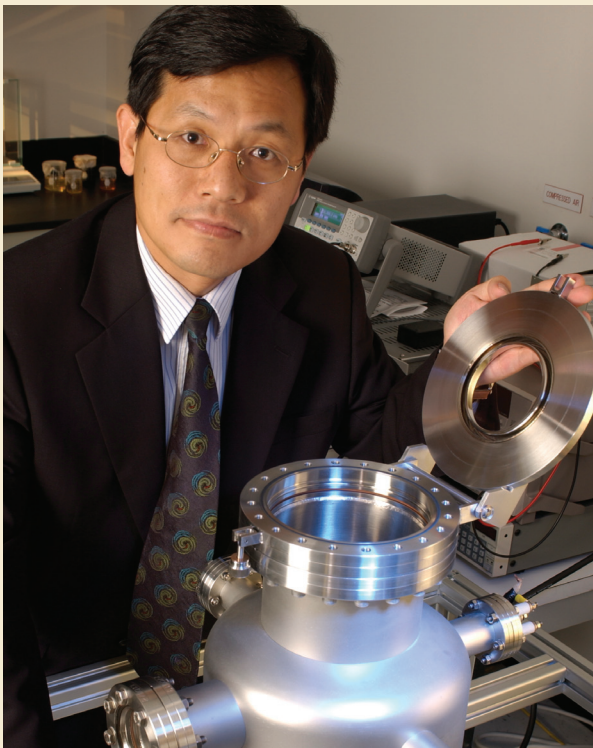
CHILDREN’S GROWTH – Professor James Waxmonsky and colleagues received a \$3 million grant from NIH to study the risk of Stimulant-Induced Growth Suppression (SIGS) with the latest Extended Release (ER) stimulants and the underlying mechanisms while providing evidenced-based treatments for its management. The study will precisely estimate the risks of SIGS, examine the underlying mechanisms, and develop treatments for it.

RESEARCH HIGHLIGHTS



WATER SUSTAINABILITY IN WEST AFRICA — The Global Water for Sustainability Program (GLOWS) launched a USAID-funded \$21 million project in West Africa. This community-engaged project focuses on food security by creating sustainable access to safe water, sanitation and improvement of hygiene in West Africa. The initiative involves a multidisciplinary team from the School of Environment, Arts and Society (SEAS), the Robert Stempel College of Public Health and Social Work, and the College of Law.

HIGH EFFICIENCY BATTERY TECHNOLOGIES — Professor Wong Bong Choi received a \$405K grant from the U.S. Air Force to develop a high efficiency flexible Li-Ion battery. This award builds on the work of Dr. Choi's laboratory on nanostructures. This research focuses on the need for high energy density, flexibility, long cycle stability and safety issues of rechargeable batteries used on small, unmanned aerial vehicles.



DRUG ABUSE AMONG U.S. LATINO POPULATIONS

— Research published by Professor Mario De La Rosa and colleagues indicates lower levels of alcohol use among Latinos post-immigration to the United States. De La Rosa's team works in the NIH-funded Center for Research on U.S. Latino HIV/AIDS and Drug Abuse (CRUSADA). Research being conducted at CRUSADA is leading to new prevention and treatment approaches to reduce drug abuse among U.S. Latino populations.

NEW PATENTS ISSUED

— Three patents were issued to FIU faculty inventors in FY 2011. Professor Sakrat Khizroev received another patent related to his "Three dimensional magnetic memory recording device." Professor David Becker received a patent for "Azulenyl nitrene spin trapping agents, methods of making and using same." This technology is part of a portfolio of Azulenyl nitrenes patents. Azulenyl nitrenes are a novel class of free radical scavenger compounds (or spin trapping agents) that have favorable characteristics for the treatment of ischemic injury. Dean Ken Furton received a patent for "Identification of humans through characteristic compounds detected in human scent." This technology has utility in the biometrics arena, given the development of methods for the identification of people through their odor signatures.



NEW TREATMENT OF HIV-INDUCED NEUROCOGNITIVE DISORDERS

— Researchers with the Institute of NeuroImmune Pharmacology in the Herbert Wertheim College of Medicine reported the role of a novel molecule (Nrf2) in the neuropathogenesis of HIV-associated neurocognitive disorder/dementia (HAND). Their studies indicate this molecule is critical for cytoprotection in activating certain detoxification genes, and that suppression of this molecule leads to increased neurotoxicity. The long-term goals of the group are to dissect out the pathways, overexpress cytoprotective Nrf2, and thus reduce the HAND incidence by reducing the HIV replication.

SELECTED FACULTY HONORS

Professor **Jim Fourqurean** of Biological Sciences represented FIU in Brussels at a meeting of the International Blue Carbon Policy Working Group, which is sponsored by UNESCO, Conservation International and IUCN. The meeting was sponsored by the European Parliament in Brussels.



Professor **Campbell McGrath**, Department of English, received a \$50,000 grant from the U.S. Artists Foundation to support his creative activities.



Professor **Ranu Jung**, chair of the Department of Biomedical Engineering, was invited by Springer to be editor-in-chief of an ambitious online and print version of the first *Encyclopedia of Computational Neuroscience*. The encyclopedia will be an international effort with more than 150 contributions.

Professor Jung also serves on the editorial boards of *IEEE*, *Neural Network*, and *Frontiers in Neuroscience*.

Professor **Yen-Chih Huang**, Biomedical Engineering, received funding from OPKO, Inc., for the "Development and Characterization of Self-Assembly Polymer vesicles for siRNA Delivery." This work will allow novel approaches for drug delivery in a Phase III clinical trial, highlighting the importance of his work to translational research.



Professor **Anthony McGoron**, Biomedical Engineering, was elected national president of the Alpha Eta Mu Beta (AEMB) Biomedical Engineering Honor Society and recognized nationally as the "Outstanding" advisor of an "Outstanding" student chapter. He was also recipient of an R-21 grant from the NIH on "Imaging for Y-90 Microsphere SIRT." Professors **Yen-Chih Huang** and **Romila Manchanda** from Biomedical Engineering and **Seza Gulec** from the Herbert Wertheim College of Medicine are co-investigators in this research.

Professor **Eric Wagner**, Robert Stempel College of Public Health and Social Work, was invited to be a member of a technical expert panel, convened by the Substance Abuse and Mental Health Services Administration (SAMHSA), to discuss the research on treatment and recovery services for youth with substance use disorders. The meeting was held in Washington, D.C.

Professor **Adriana Campa**, Robert Stempel College of Public Health and Social Work, was appointed to the National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB). The advisory board is mandated by Congress to provide advice to the Secretary of Agriculture and is the most important advisory board at USDA.



The NSF has selected Professor **Naphtali Rishe**, Computer Science, as principal investigator and chair of a direction-setting Workshop on Knowledge Mining and Bioinformatics Techniques to Advance Personalized Diagnostics and Therapeutics. Additionally,

the U.S. Department of Homeland Security selected Rishe to organize and co-chair their annual Analytic Conference. Rishe's team's NSF grant portfolio expanded to include a \$10 million CREST award (Centers of Research Excellence in Science and Technology), and two \$5 million Major Research Instrumentation awards.

Professor **James Waxmonsky**, Herbert Wertheim College of Medicine, was named to the editorial board of the *Journal of Child and Adolescent Psychopharmacology*, served as a member of a special emphasis panel at NIDA (Cognitive Remediation Approaches to Improve Drug Abuse Treatment Outcomes), and was named one of the Best Doctors in America for Psychiatry by Doctors Inc.

Professor **Barry Rosen**, Herbert Wertheim College of Medicine, was the keynote speaker at three international meetings: the 11th International Conference on Biogeochemistry of Trace Elements (ICOBTE) in Florence, Italy; the 2nd International Workshop on Antimony in the Environment at Friedrich-Schiller University in Jena, Germany; and the 17th Arsenic Symposium in Tsukuba, Japan. As part of his participation in the symposium in Japan, he was awarded a fellowship. He presented lectures over a two-week period at Hiroshima University, Okayama University, Osaka University, Tokyo University, and Iwate Medical University. Professor Rosen's studies on arsenic transport have been highlighted in major journals over the last year, including the covers of the journals *Molecular Microbiology* and *Metallomics*.



Professor **Mary Jo Trepka**, Epidemiology, received the Presidential Early Career Award for Scientists and Engineers, the highest honor bestowed by the United States government on scientists in the early stages of their careers. The award

was conferred by President Barack Obama. Trepka is the principal investigator on a five-year, \$1.25 million grant investigating how contextual factors (community deprivation, segregation, and rural residence, among others) contribute to the survival of disadvantaged African Americans who are HIV positive. This study, funded by the National Institute for Minority Health and Health Disparities, will lay the groundwork for interventions and policy changes aimed at improving the survival and quality of life of African Americans with HIV.

Professor **David Cohen** received the Distinguished Tocqueville-Fulbright Chair Award and will be visiting Professor at Université de Poitiers, France, during 2012. Cohen's research and scholarship seeks to develop lines of critical thought as alternatives to biopsychiatric conceptions of distress and misbehavior, and to conventional views about the "safety and efficacy" of psychiatric drug treatment.



Professor **Anuradha Godavarty**, Biomedical Engineering, and her team invented the first hand-held optical device capable of 3-D tumor detection. The device, which complements x-ray mammography, is showing early promise in improving the diagnosis of breast cancer. The technology is neither radiative nor invasive, and the patient experiences no pain or discomfort from breast compressions. Since optical imaging tools are relatively inexpensive and portable, this innovative device also makes diagnostic testing more feasible and affordable for most patients.



Professor **Marilys Nepomechie**, Architecture, led a group of FIU students to Washington, D.C., to participate in the world-renowned competition: the 2011 U.S. Department of Energy's Solar Decathlon. The U.S. Department of Energy Solar Decathlon invited 20 collegiate teams from around the world to design, build and operate solar-powered houses that are affordable, energy efficient and attractive. FIU's entry tied for first place for energy balance, producing all the power the house used with its solar array.

SELECTED STUDENT HONORS

Deepak Balla, Ph.D. candidate in Biological Sciences, received a Cystic Fibrosis Foundation Traineeship Award for “Identifying intermediate transcriptional regulators of the *Pseudomonas aeruginosa* AmpR virulence regulon,” and an NIH Student Summer Research Award for “metabolic profiling and cytotoxicity of *pseudomonas aeruginosa* AmpR mutant.”

Ana Paula Benaduce, Ph.D. candidate in Biological Sciences, won first place for best oral presentation at the NanoFlorida 2011- The Fourth Annual Nanoscience Technology Symposium for her talk “effects of endothelin 3 on biomechanics of melanocytes and melanoma cells.” She also received a travel award to present her work at the XXI International Pigment Cell Conference, held in Bordeaux, France.

Derek Burkholder, Ph.D. candidate in Biological Sciences, traveled to Berwick Academy, South Berwick, Maine, to speak to 100 middle school science students about his research in Shark Bay, Western Australia. In addition, he conducted two professional development seminars for a total of 125 Miami-Dade fifth grade teachers, introducing the Shark Bay Video Lesson Plan curriculum developed around the work of FIU’s Dr. Mike Heithaus and others in Shark Bay. He also traveled to Wilson’s Mills Elementary in Wilson’s Mills, North Carolina, to speak to 575 students (kindergarten to fifth grade) about science and his work in Shark Bay.

Erica Cahoon, a doctoral student in the Department of Chemistry, was first author on a paper accepted in the prestigious journal *Analytical Chemistry* on the use of Laser Induced Breakdown Spectroscopy (LIBS) for the analysis of aerosols and microdrops. She was invited to the Lawrence Berkeley National Laboratory to present on this work.

Norma Iris Caraballo, a doctoral student in the Department of Chemistry, won the 2012 Forensic Sciences Foundation Student Scholarship Award Competition of the American Academy of Forensic Sciences.

Dr. Sarah Erickson was named a “*Worlds Ahead*” graduating doctoral student at FIU at the Spring 2011 commencement. She was also named the Outstanding Ph.D. Student by the College of Engineering and Computing. Erickson was a recipient of the Session Best Paper Award at the 14th World Multi-Conference on Systems, Cybernetics and Informatics, and received a Research Excellence travel award for SPIE Photonics. She received a post-doctoral fellowship from the American Cancer Society (ACS) in collaboration with the Canary Foundation, which supports research on early detection of cancer.

Jessica Greenwood, M.S. in Higher Education Administration, won the 2011 Outstanding NODA (National Orientation Directors Association) Intern Award. This honor recognizes individuals who have demonstrated commitment to learning, professional development and service through the successful completion of a NODA internship experience. She received the award after completing an internship this past summer at the University of Wisconsin-Madison.

Recent graduate **Dr. Indranil Lahiri** was selected as one of the finalists receiving the Graduate Excellence in Materials Science (GEMS) Award, given by American Ceramic Society. Lahiri was also awarded the College of Engineering and Computing's best Ph.D. student award for Fall 2011. His scholarly production at FIU included 14 published journal papers (eight as first author), four journal papers under submission/preparation, four published/accepted peer-reviewed conference proceedings, two book chapters, and 30 conference-level presentations (18 as first presenter). He has also been a reviewer for 10 journals.

FIU graduate **Dr. Masha Plakhotnik**, Ed.D. in Adult Education and Human Resource Development, was named one of three finalists for the 2011 prestigious M.S. Knowles Dissertation-of-the-Year Award, presented annually at the Academy of Human Resource Development Conference of the Americas.

Chemistry doctoral graduate **Dr. Paola Prada** was awarded a two-year postdoctoral research fellowship by the intelligence community. She will be presenting her work at the 12th annual Intelligence Community Postdoctoral Research Fellowship Colloquium to be held April 23-26, 2012, at the Ritz-Carlton in Tysons Corner, VA.

Elizabeth Stoner, Ph.D. candidate in Biological Sciences, was awarded a \$118,000 EPA Star fellowship for her project "effects of nutrient loading and native invaders on biotic homogenization of seagrass habitats."

Kristie Wendelberger, Ph.D. student in Biological Sciences, received a George M. Wright Climate Change Fellowship in the amount of \$20,000 from the National Park Service for her project "Detecting long-term community shifts in response to sea level rise and Everglades' restoration: Can remote sensing, competitive ability, and life stage be used in guiding conservation actions?"

Two Ph.D. students in Geosciences, **Cheng Tao** and **Joseph Zagrodnik**, received the 2011-2014 NASA Earth System Science Fellowship (\$90,000 each). Tao's award was based on "climatology of hot towers in tropical cyclones and their role in tropical cyclone intensity changes based on 12 years of TRMM data," and Zagrodnik's award was based on "diurnal cycle of precipitation features and quantitative comparison of precipitation algorithms in tropical cyclons." Both students also received the NASA Genesis and Rapid Intensification Processes (GRIP) Group Achievement Award, 2010.

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