



Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY

A collage of four images: top-left shows green foliage; top-center shows a person in a lab coat working; top-right shows a yellow and black electrical transmission tower; bottom shows a close-up of blue electronic components.

DOE-EM Cooperative Agreement Year 3 Research Review Project 5: DOE-FIU Science & Technology Workforce Development Initiative

Presented: May 1, 2013
to the U.S. Department of Energy
by Dr. Leonel Lagos, PhD, PMP®
Director of Research and Principal Investigator (PI)

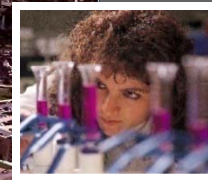
Worlds
Ahead

Advancing the research and academic mission of Florida International University.

Evolution of FIU ~ 41 years old



1972 opening: 6,000 students



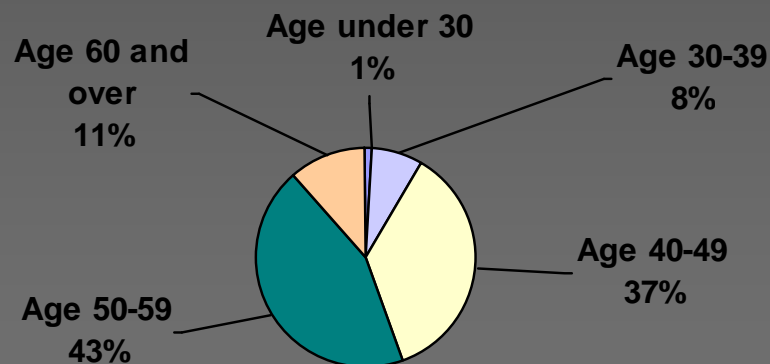
TODAY

- ~50,000 students
- Among the nation's 25 largest universities
- Top producer of Hispanic STEM students



An Aging Workforce: the DOE EM Workforce

- Age 40 and above: **91%** of EM's workforce
- Age 30 – 39: **8%** of EM's workforce
- Age 30 and below: **1%** of EM's workforce



Who will continue DOE-EM Environmental Restoration Mission in the future?

DOE-FIU Cooperative Agreement



Deactivation & Decommissioning



Soil & Groundwater



Waste Processing



Workforce Development



IT Applications for Environmental Management

"Working together for a safer and cleaner environment."



FIU

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Center

FLORIDA INTERNATIONAL UNIVERSITY

Dr. Leonel E. Lagos, Principal Investigator

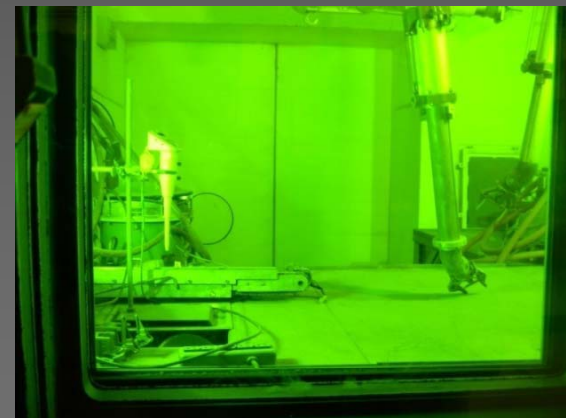


DOE-FIU Cooperative Agreement

- DOE-FIU program established in 1995 as a partnership between Florida International University and DOE's Office of Science & Technology (EM-50)
- Since 1995 the Center has executed over 300 applied research projects for DOE in the areas of:
 - Deactivation & Decommissioning (D&D)
 - Soil & Groundwater Research & Modeling
 - Waste Processing/High Level Waste
 - Information Technology Development for Environmental Management
 - Workforce Development & Training
- The Center counts with five research facilities, a radiological lab, a high bay facility, and a Large Scale Technology Test Site
- The Center collaborate with other FIU's Centers & laboratories (Chemistry, SERC, AMERI) to accomplish DOE-EM applied research
- The Center supports 18 full time researcher (scientists and engineers), FIU faculty and about 30 students per year being trained in DOE-EM research (DOE Fellows Workforce Initiative)



DOE-EM Environmental Restoration





DOE Fellows Program Description

*In 2007, FIU's Applied Research Center (ARC) established a partnership with the U.S. Department of Energy's Office of Environmental Management to specifically train STEM, minority FIU students in an effort to create of **pipeline** of scientists and engineers that will enter DOE's workforce upon completing their degrees and research at FIU.*



Eligibility Requirements

- United States Citizens/Permanent Resident Aliens
- Minimum 3.0 grade point average
- Two letters of recommendation from faculty members
- Fill out Program's application (<http://fellows.fiu.edu>)
- FIU Students classified as undergraduates (juniors and seniors) or graduate students (Masters & Ph.Ds)
- Open to students in science, technology, engineering, and math (STEM) disciplines



Students Recruitment

- DOE Fellows recruiting other FIU students
- Information Sessions (Spring and Fall semesters)
- In-class presentations for selected STEM discipline courses
- FIU Career and Engagement Office
- Presentations at student societies (ASME, SHEP, SBEP, SWE, etc)
- DOE Fellows Selection Committee integrated by DOE-EM (HR and Technical), FIU College of Eng., FIU College of Arts & Sciences, and ARC staff



Program Components & Benefits

- DOE Fellows participation in 10-weeks Summer Internships across DOE Complex (HQ, sites, labs, DOE contractors)
- DOE Fellows perform hands on DOE-EM applied research while completing their degrees (20 hrs/week)
- Participation in conferences and workshops (WM, ANS Annual Meeting, Argonne Nat. Lab D&D training courses)
- One-on-One mentorship and supervision by ARC staff
- Professional development and networking
- Direct access to DOE and DOE contractors professionals
- Development of Sr. Design projects, thesis and/or Ph.Ds
- Tuition waivers for graduate students (Masters & Ph.Ds)



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A collage of six images representing various scientific and technological fields: a green-tinted image of a plant, a person in a lab coat and mask, a yellow-tinted image of a power line tower, a blue-tinted image of a microchip, a close-up of a human eye, and a blue-tinted image of several small electronic components.

DOE-FIU Science & Technology Workforce Development Program

Accomplishments

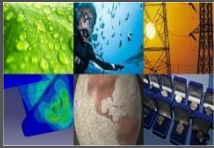
*Worlds
Ahead*

Advancing the research and academic mission of Florida International University.



DOE Fellows Training at FIU

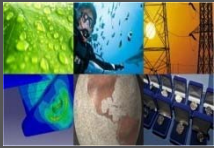




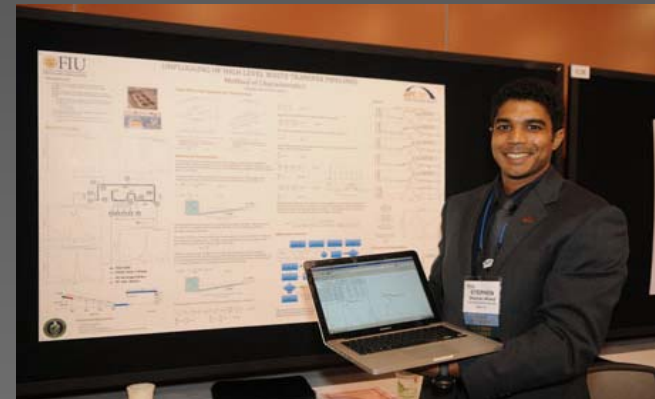
DOE Fellows Induction Ceremony



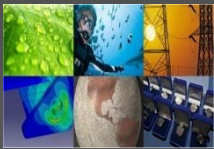
Conducted 6 Induction Ceremonies since program inception in 2007. A total of **78 FIU minority STEM students** have been inducted as DOE Fellows.



DOE Fellows at Waste Management Symposia



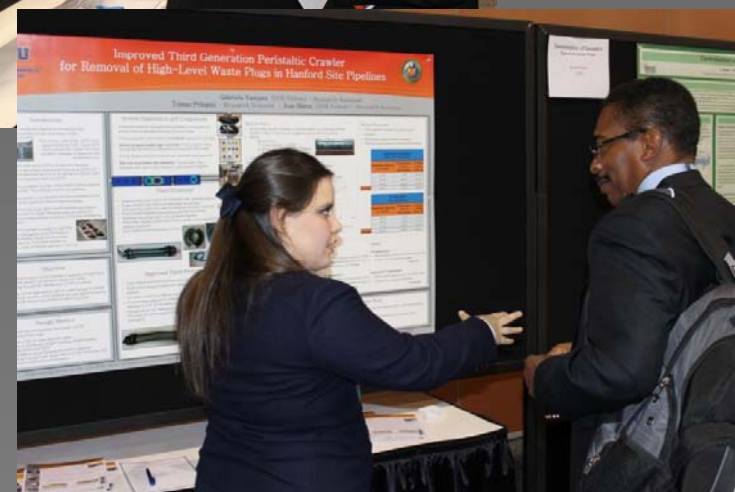
A total of **91 DOE Fellows** have presented at Waste Management Symposia since 2008. Obtained Best Student Poster 3 years in a row and Best Professional Poster in 2009 (DOE Fellow, Leydi Velez).



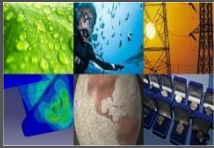
DOE Fellows at WM Conference



**WM Discussion Panel with
DOE Fellow Ximena Prugue**



WM Student Poster Session



75 DOE Fellows Internships Completed





Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY



Pacific Northwest
NATIONAL LABORATORY



Battelle



washingtonriver
protectionsolutions



SRNL
SAVANNAH RIVER NATIONAL LABORATORY

Ahead

Advancing the research and academic mission of Florida International University.



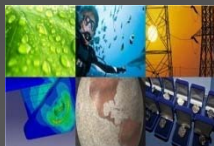
Internships Summer 2012



DOE Fellow Claudia Cardona at DOE-HQ EM-12 (Soil/Groundwater)
Mentor: Mr. Kurt Gerdes



DOE Fellow Janty Ghazi at DOE-HQ EM-23
Mentor Dr. James Poppiti



Internships Summer 2012



**DOE Fellow Robert Lapierre at Pacific Northwest National Laboratory
Richland, WA**



**DOE Fellow Joshua Midence at Savannah River Site
Aiken, SC**



**DOE Fellow, Heidi Henderson with
mentor Dr. Eric Pierce at Oak
Ridge National Laboratory**



**DOE Fellow Jaime Mudrich & Eric
Inclan with Dr. Joshi at the High
Flux Isotope Reactor**



DOE Fellows with the Oak Ridge National Laboratory team



Internships Summer 2012



DOE Fellow Ximena Prugue with mentor Ron Calmus at Washington River Protection Solutions (WRPS) in Richland, WA



Internships Summer 2012



**DOE Fellow Lilian Marrero with
mentor Dr. Jennifer Knoepfle at
Sullivan International Group, Inc.,
Chicago, IL**



**DOE Fellow Elicek Delgado-Cepero
with Sullivan International
Consulting colleagues
Chicago, IL**



Annual DOE Fellows Poster Exhibition





Major Accomplishments

- **75** internships completed at DOE sites, DOE national labs, DOE-HQ, and DOE contractors at DOE site, DOE national labs, DOE-HQ, and DOE contractors
- 18 DOE Fellows internships conducted at Oak Ridge National Lab
- **78** students recruited/inducted as DOE Fellows since program inception in 2007
- **91** presentations (posters and papers) at Waste Management conferences (2008 to 2013), and **6** student presentations at American Nuclear Society conf.
- Won Best Professional Poster (Leydi Velez) and 3 Best Student Posters (Denisse Aranda, Danny Carvajal, and Stephen Wood) at Waste Management Conference 2008-2012
- **30** Fellows have continued from undergraduate to graduates studies and obtained master and PhD degrees at FIU (research based on DOE-EM work)



Major Accomplishments

- **3** DOE Fellows (Rosa Ramirez, Lee Brady, Edgard Espinosa) hired into DOE-EM and have gone to work for DOE-EM (DOE-HQ in Washington, DC)
- **1** DOE Fellow (Charles Castello) hired at Oak Ridge National Laboratory
- **7** DOE Fellows hired by other federal and state agencies including, Department of Defense (1) , Department of Commerce (1), Internal Revenue Service (1 Fellow), Department of Health & Humans Services (1), Florida Department of Environmental Protection (1 Fellow), NASA (2 Fellows)
- **3** DOE Fellows hired by DOE contractors – AREVA (1 Fellow), Waste Control Specialists (1 Fellow) , and Bechtel (1 Fellow)
- **15** Other DOE Fellows have graduated FIU with bachelors or masters degree and obtained employment at Boeing Company (3 Fellows), Florida Power & Light (2 Fellows), General Electrics (1 Fellow), Lockheed Martin (1 Fellow), Mount Sinai Medical Center (2 Fellow), Johnson & Johnson (1 Fellow), PriceSmart Inc. (1 Fellow), Bouygues Civil Works Florida (1 Fellow), Crane Aerospace and Electronics (1 Fellow), HP Foundation (1 Fellow), PSI (1 Fellow)



Masters & Ph.Ds

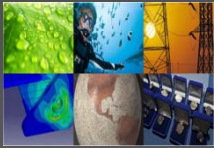
DOE Fellow	Exp. Degree	Major	Topic of Research
Robert Lapierre	M.S.	Chemistry	Uranium sequestration by pH manipulation using NH3 gas
Joel McGill	M.S.	Civil engineering	Degradation of Grout: Compressive Strength Comparative Analysis
Valentina Padilla	B.S.	Environmental engineering	Effects of Si and Al concentration ratios on the removal of uranium
Mariela Silva	M.S.	Engineering management	SharePoint based secured collaboration system
Revathy Venkataraman	M.S.	Information technology	Performance analysis of mobile applications accessing web services built using windows communication foundation
Claudia Cardona	Ph.D.	Civil engineering	Evaluating the effects of Si and Al concentration ratios on the removal of uranium
Elicek Delgado-Cepero	M.S.	Electrical engineering	Developing wireless monitoring systems and instrumentation
Heidi Henderson	M.S.	Environmental engineering	Developing water balance model to simulate surface water and total suspended solids transport
Janty Ghazi	M.S.	Engineering management	Asynchronous pulsing as a means of unplugging high level waste transfer pipelines
Jose Matos	B.S.	Mechanical engineering	Development of peristaltic crawlers for unplugging of Hanford waste transfer pipelines
Joshua Midence	B.S.	Civil engineering	Saltstone Processing of Low-Level Waste at Savannah River Site
Lillian Marrero	M.S.	Civil engineering	Modeling of mercury and suspended solids
Paola Sepulveda-Medina	M.S.	Biomedical Engineering	Uranium bioremediation
Jaime Mudrich	M.S.	Mechanical engineering	Multiphase simulations with an emphasis on solid-fluid interaction in complex domains



Eric Inclan	M.S.	Mechanical engineering	Asynchronous pulsing method for unplugging high-level waste pipelines
Yulyan Arias	B.S.	Environmental engineering	Sequestering uranium by in situ subsurface pH manipulation using NH ₃ gas
Melissa Sanchez	B.S.	Environmental engineering	Uranium remediation in the vadose zone
Elsa Cabrejo	M.S.	Environmental engineering	Modeling interactions of sediment with mercury
Denny Carvajal	B.S.	Biomedical Engineering	Uranium remediation in the vadose zone
Mario Vargas	B.S.	Mechanical engineering	Development of a remote platform for characterization of nuclear stacks
Amaury Betancourt	M.S.	Environmental engineering	Effects of mercury in anaerobic bacteria
Lee Brady	M.S.	Mechanical engineering	Technologies for unplugging of high-level waste pipelines
Duriem Calderin	M.S.	Biomedical Engineering	Pilot scale experimental design for a wiped film evaporator
Charles Castello	Ph.D.	Electrical engineering	Development of a methyl-mercury analyzer
Melina Idarraga	B.S.	Civil engineering	Quantifying the dissolution of autunite as a function of aqueous bicarbonate.
Rosa Ramirez	B.S.	Biomedical Engineering	Study of mercury speciation in a contaminated watershed
Stephen Wood	M.S.	Mechanical engineering	Investigation of methods for high-level waste pipeline unplugging
Edgar Espinoza	M.S.	Mechanical engineering	Design Optimization of Submerged Jet Nozzle to Enhance Mixing. Also, involved in studying and understanding the Lattice Boltzmann Method



Serkan Akar	M.S.	Biomedical engineering	Developing a Biosensor for Detection of Phosphate Species in Uranium Contaminated Ground Water and Wastewater Sediments by Employing Advanced Biotechnological Methods
Merlin Ngachin	M.S.	Geosciences	Tests and evaluate a new technology, namely SIMWyPES [®] , by Babcock & Wilcox and used at the Y-12 National Complex at Oak Ridge National Laboratory (ORNL)
William Mendez	M.S.	Engineering Management	Development of a conceptual design of a robotic mechanism. This device was developed as a survey tool for physical and chemical characterization of contaminated nuclear stacks.
Erika McKinney	M.S.	Biomedical Engineering	
Leydi Velez	M.S.	Engineering Management	Lessons Learned (LL) and Best Practices (BP) acquired in most DOE sites. Also, involved in the development of the D&D Knowledge Management Information Tool (KM-IT)



DOE Fellows Having Fun & Helping the Community



Phoenix, Arizona



Great Smoky Mountains, TN



Beach Cleanup, Key Biscayne FL



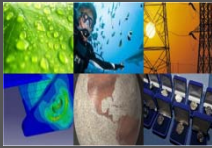
Snowbowl Mountain, AZ



White Salmon, Washington



DOE Fellows Christmas Party 2009



Program Website and Facebook

<http://fellows.fiu.edu>

Follow us in Facebook at:

FIU Science and Technology Workforce Development Initiative

The website features a navigation menu on the left with links to Program Home, Program Description and Components, How to Apply, DOE Fellows Bios, DOE Fellows Internships, DOE Fellows Highlights, Events & News, Contact Us, DOE EM Newsletter, and Links. The main content area includes a 'First Place at FIU Libraries UG Student Research Award' announcement for Rinaldo Galdamez, a 'Congratulations Rinaldo Galdamez' banner, and a 'Featured DOE Fellow' section for Rinaldo Gonzalez Galdamez. A 'Latest News' section at the bottom mentions a DOE Fellow poster exhibition.

The Facebook page shows the profile of the Applied Research Center at Florida International University. The cover photo features the ARC logo. The page has tabs for Wall, Info, Photos, Discussions, Links, and Events. The main content area displays two 'DOE Fellow of the Week' posts. The first post is for Nadia Lima, dated October 25 at 5:14pm, with likes from Denise Veronica, Duro Dale, and 2 others. The second post is for Edgard Espinosa, dated October 13 at 10:59am, with likes from Henry Diaz, Denise Veronica, Duro Dale, and 2 others. The page also includes a 'What's on your mind?' status box and a 'Get More Connections' button.



Work Proposed for CA FIU Year 4

- Continue selection & recruitment of qualified, talented FIU minority STEM students
- Engage all DOE Fellows in EM applied research conducted in projects 1-4
- Conduct summer internships at DOE sites, HQ, nat. laboratories and DOE contractors
- Conduct DOE Fellows Poster Competition (Oct. 2013)
- Conduct Induction Ceremony 2013 (Nov. 2013)
- Two DOE Fellows will participate in International Conference for Radioactive Waste Management (ICEM), students are being fully sponsored by ASME
- Participate in WM symposia 2014
- Coordinate efforts with EM-70 to identify employment opportunities for DOE Fellows



DOE Fellows Video

- The DOE Fellows Experience Video