FIU-DOE Mid-Year Review 2014

Monday, Feb 24th

10:00 A.M. – 11:00 A.M. *Presentation - D&D and Environmental Management IT Research (FIU Project 4)*

11:00 A.M. – 12:00 P.M. *Discussion of research area in support of EM*

Tuesday, Feb 25th

1:00 P.M. - 2:00 P.M. *Presentation - High Level Waste/Waste Processing Research (FIU Project 1)*

2:00 P.M. - 3:00 P.M. Discussion of research area in support of EM

Wednesday, Feb 26th

2:00 P.M. - 3:00 P.M. *Presentation - Workforce Development and Training (FIU Project 5)*

3:00 P.M. - 4:00 P.M. Discussion of research area in support of EM

Thursday, Feb 27th

10:00 A.M. - 11:00 A.M. *Presentation - Soil & Groundwater Research – Oak Ridge (FIU Project 3)*

11:00 A.M. - 12:00 P.M. Discussion of research area in support of EM

2:00 P.M. - 3:00 P.M. *Presentation - Soil & Groundwater Research – Hanford (FIU Project 2)*

3:00 P.M. - 4:00 P.M. *Presentation - Soil & Groundwater Research – SRS (FIU Project 2)*

Friday, Feb 28th

10:00 P.M. - 12:00 P.M. *Wrap-up: Discussion of DOE-FIU Cooperative Agreement*

FIU Applied Research Center

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA

FIU | Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY

FIU-ARC STEM Workforce Development Program

Dr. Leonel Lagos, PhD, PMP®
Director of Research
Principal Investigator

Florida International University
Applied Research Center

Worlds Ahead

Advancing the research and academic mission of Florida International University.

Project Staff and Students

Program Director: Leonel Lagos, PhD, PMP®

Faculty/Staff: Peggy Shoffner, Angelique Lawrence, Walter Quintero, David Roelant, Justin Phillips

DOE Fellows

Project 1

DOE Fellow	Program	Project-Subtask	Project Title
Adam Manoussakis	Undergraduate	Project 1-Subtask 2.1	Development of Alternative Unplugging Technologies
Alexandra Fleitas	Undergraduate		
Carmela Vallalta	Undergraduate		
Deanna Moya	Undergraduate	Project 1-subtask 2.4	Computational Simulation and Evolution of HLW Pipeline Plugs
Michael Abbott	Undergraduate	Project 1-Subtask 17.1	Multiple-Relaxation-Time, Lattice Boltzmann Model for High-Density Ratio, Multiphase Flows
Sasha Philius	Undergraduate		
Dayron Chigin	Undergraduate	Project 1 - Subtask 18.1	Evaluation of SLIM for Rapid Measurement of HLW Solids on Tank Bottoms
Gabriela Vazquez	Undergraduate	Project 1 - Subtask 18.2	Development of Inspection Tools for DST Primary Tanks
Jennifer Arniella	Undergraduate		
Ximena Prugue	Undergraduate	Project 1	Continuation of summer internship task for innovative methods to perform dry retrieval of tank waste

Project 2

DOE Fellow	Program	Project-Subtask	Title
Claudia Cardona	Graduate (PhD)	Project 2 - Subtask 1.1	Sequestering Uranium at the Hanford 200 Area by In Situ Subsurface pH Manipulation using Ammonia (NH3) Gas Injection
Robert Lapierre	Graduate		
Paola Sepulveda	Graduate	Project 2 - Subtask 1.2	Investigation on Microbial-Meta-Autunite Interactions - Effect of Bicarbonate and Calcium Ions
Joel McGill	Graduate	Project 2 - Subtask 2.1	FIU's support for groundwater remediation at SRS F/H Area
Hansell Gonzalez	Graduate (PhD)		
Valentina Padilla	Graduate	Project 2 - Subtask 2.2	Monitoring of U(VI) bioreduction after ARCADIS demonstration at F-Area
Christian Pino	Undergraduate	Project 2 - Task 2	Remediation research and technical support for Savannah River Site

Project 2

DOE Fellow	Program	Project-Subtask	Thesis
Claudia Cardona	Graduate	Project 2 - Subtask 1.1	The formation and stability of U-bearing precipitates created via in-situ NH3 gas injections in the vadose zone
Robert Lapierre	Graduate		Characterization of the Uranium-Bearing Products of Novel Remediation Technologies
Paola Sepulveda	Graduate	Project 2 - Subtask 1.2	Investigating the role of a less uranium tolerant strain, isolated from the Hanford site soil, on uranium interaction in polyphosphate remediation technology
Joel McGill	Graduate	Project 2 - Subtask 2.1	The synergy effect of Si and humic acid on the removal of U(VI)

Project 3

DOE Fellow	Program	Project-Subtask	Title
Natalia Duque	Undergraduate	Project 2 - Task 3	Environmental Remediation Optimization: Cost Savings, Footprint Reductions, and Sustainability Benchmarked on DOE Sites

Project 4

DOE Fellow	Program	Project-Subtask	Title
Michelle Embon	Undergraduate	Project 4 - Task 1	Waste Information Management System (WIMS)
Mariana Evora	Undergraduate	Project 4 - Task 2	D&D Support to DOE EM for Technology Innovation, Development, Evaluation, and Deployment
Mariela Silva	Graduate		
Revathy Ventakaraman	Graduate		
Pedro Cordon	Undergraduate	Project 4 - Task 3	Knowledge Management Information Tool - Application to Deactivation & Decommissioning
Steve Noel	Undergraduate		

DOE Fellow	Program	Project-Subtask	Thesis
Revathy Ventakaraman	Graduate	Project 4 - Task 2	Performance Evaluation of Mobile Applications with Deactivation & Decommissioning (D&D) Technology Services

DOE-FIU Cooperative Agreement

"Working together for a safer and cleaner environment."

Dr. Leonel E. Lagos, Principal Investigator

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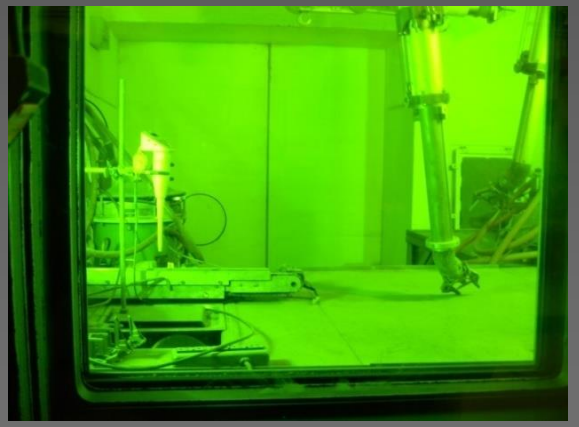
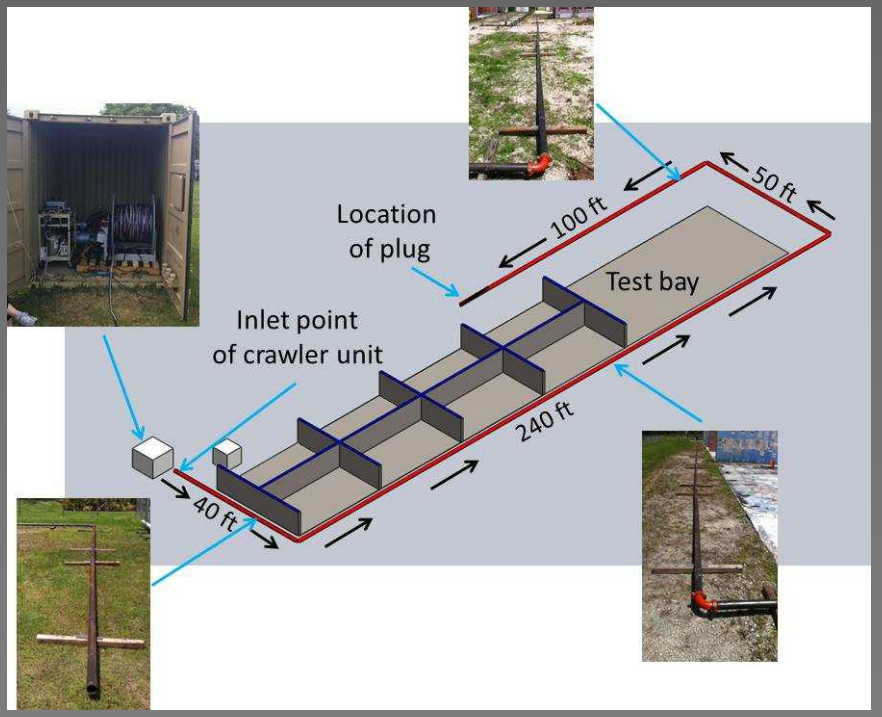
DOE-EM Environmental Restoration



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).
- Established Technology Evaluation/Demonstration Program for DOE-EM and constructed a Large Scale Technology Demonstration Site at FIU. Over 300 technology evaluation/demonstration and technology development projects were conducted.
- In 2007, the Center established the DOE Fellows Initiative. The program supports approximately 30 students per year being trained and mentored to enter the DOE-EM, DOE national labs, and DOE contractors' workforce (Workforce Development Program).
- The DOE-FIU Program supports project and research efforts at DOE-HQ, DOE sites (Hanford, Savannah River, Oak Ridge, Moab), and DOE national laboratories (ORNL, PNNL, SRNL, Los Alamos).

High Level Waste – Pipeline Unplugging

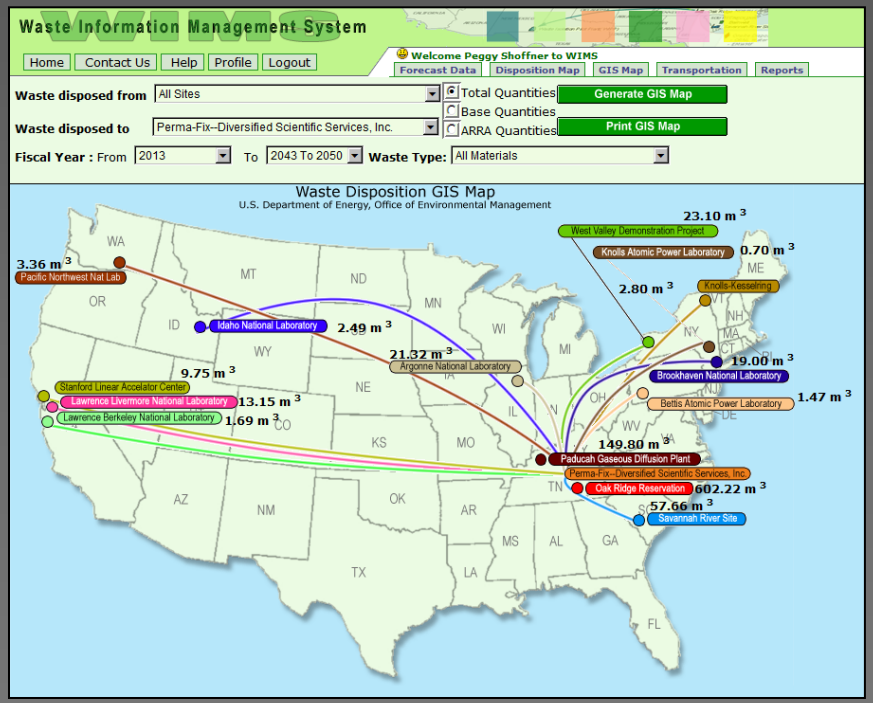


Soil and Groundwater

Technology Development & Evaluations

In Situ Decommissioning Sensor Network

Waste Information Management System (WIMS)



Print GIS Map

http://www.emwims.org

D&D Knowledge Management Information Tool

www.dndkm.org

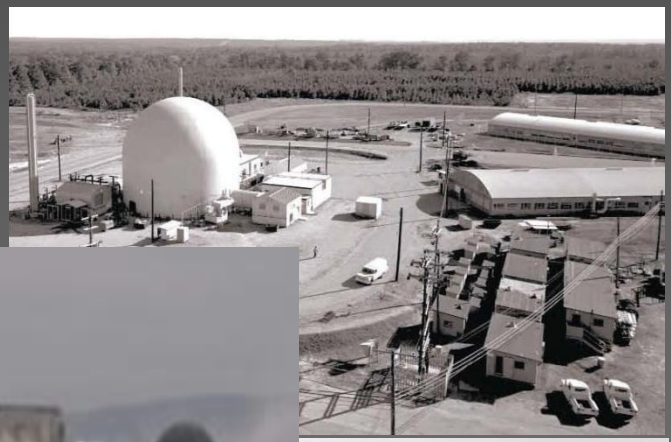
D&D Knowledge Management

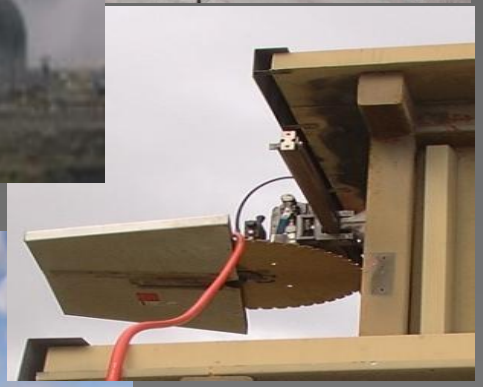
Knowledge Management for D&D

- D&D Hotline
- Technology Module
- Vendor Module
- Collaboration tools
- Mobile application for vendor and specialist modules
- Currently:
  - 535 registered users
  - 64 registered subject matter specialists
  - 662 vendors
  - 688 technologies

Lessons Learned/Best Practices

Supporting the Energy Facility Contractors Group (EGCOG) in the development of Lessons Learned and Best Practices. A total of 13 have been developed and 7 have finished the review and approval process and been published on the D&D KM-IT and EFCOG websites.



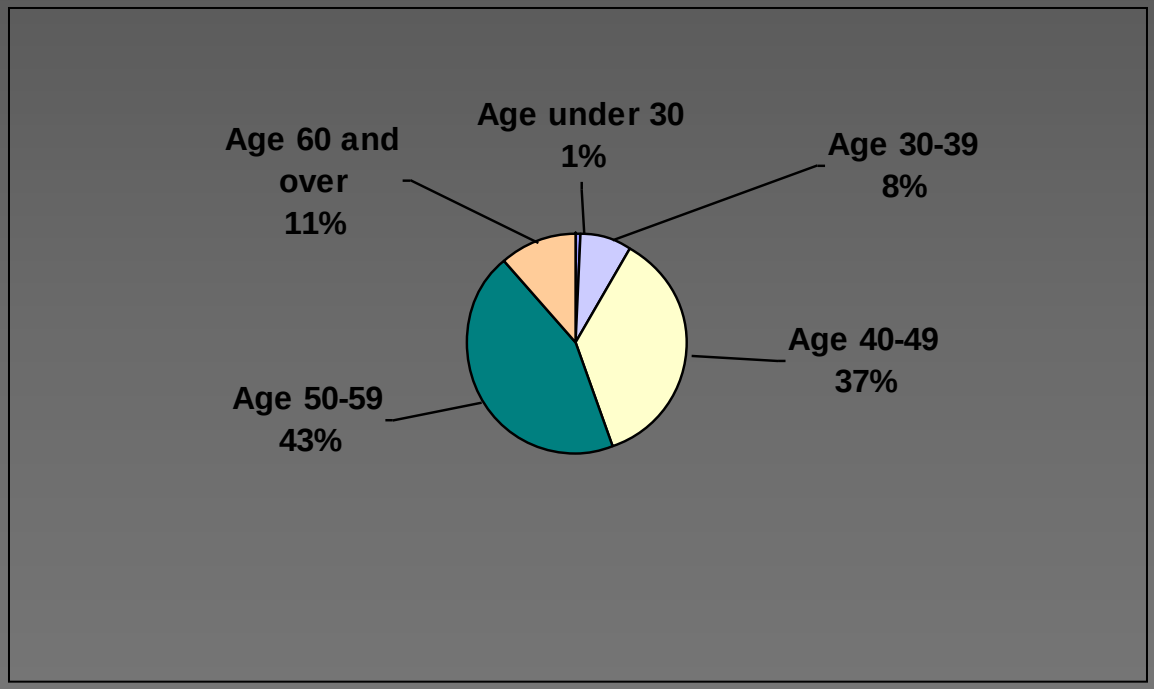


DOE Fellows Program Description

*FIU's Applied Research Center (ARC) is supporting the U.S. Department of Energy's Office of Environmental Management in the training of 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.*

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



Program's Components

- Paid 10-week summer internships at DOE national laboratories, DOE sites, DOE-HQ or DOE contractors, working under the supervision of DOE scientists (mentors).
- Paid 20 hours/week Student Research Assistantship at ARC during school year.
- Research experience with ARC scientists at FIU during school year: one-on-one mentoring performing **"hands on"** DOE-related applied research.
- Tuition waiver for graduate studies (Master, PhDs).
- 2 to 4 years Developmental Training Program (depends on masters or PhD track).
- DOE Lecture Series and technical seminars.
- Participation in conferences/workshops.

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 (fellows.fiu.edu)
- Open to undergraduate (juniors and seniors) and graduate students
- Under-represented minority students

Student 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 Engr., FIU College of Arts & Sciences, and ARC staff

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DOE-FIU Science & Technology Workforce Development Program

Accomplishments

Worlds Ahead

Advancing the research and academic mission of Florida International University.

DOE Fellows Hands on Research at FIU

Major Accomplishments

- **81** internships completed at DOE sites, DOE national labs, DOE-HQ, and DOE contractors
- **18** DOE Fellow internships conducted at Oak Ridge National Lab
- **93** students recruited/inducted as DOE Fellows since program inception in 2007
- **95** presentations (student posters and professional papers) at Waste Management conferences (2008 to 2013), and **6** student presentations at American Nuclear Society conference
- Won Best Professional Poster (Leydi Velez) and 3 Best Student Posters (Denisse Aranda, Danny Carvajal, and Stephen Wood) at Waste Management Conferences 2008-2012
- Many DOE Fellows are also selected to FIU's McNair Fellowship
- **31** Fellows have continued and obtained master and PhD degrees at FIU and conducted their research at ARC or DOE national labs
- 2 DOE Fellows participated in the International Conference for Radioactive Waste Management (ICEM13), students were being fully sponsored by ASME

Major Accomplishments

- **3** DOE Fellows (Rosa Ramirez, Lee Brady, Edgard Espinosa) hired into DOE-EM at DOE-HQ in Washington, DC
- **1** DOE Fellow (Charles Castello) hired at Oak Ridge National Laboratory
- **8** DOE Fellows hired by other federal and state agencies including, Department of Defense (1) , Department of Commerce (1), Department of State (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)
- **O**ther DOE Fellows have graduated FIU with bachelors or masters degrees 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	M.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 similar 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

Masters & Ph.Ds

Eric Inclan	M.S.	Mechanical engineering	Asynchronous pulsing method for unplugging high-level waste pipelines
Yulyan Arias	M.S.	Environmental engineering	Sequestering uranium by in situ subsurface pH manipulation using NH3 gas
Melissa Sanchez	M.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	M..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.

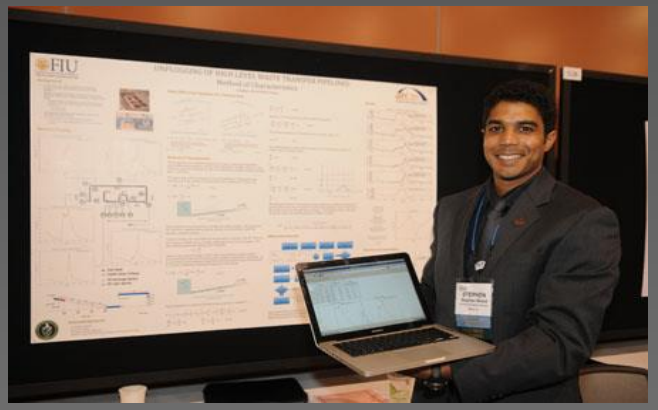
Masters & Ph.Ds

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	Department project
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 Induction Ceremony

Conducted a total of 6 Induction Ceremonies since program inception in 2007. A total of **93 FIU minority STEM students** have been inducted as DOE Fellows.

DOE Fellows at Waste Management Symposia



A total of 95 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.

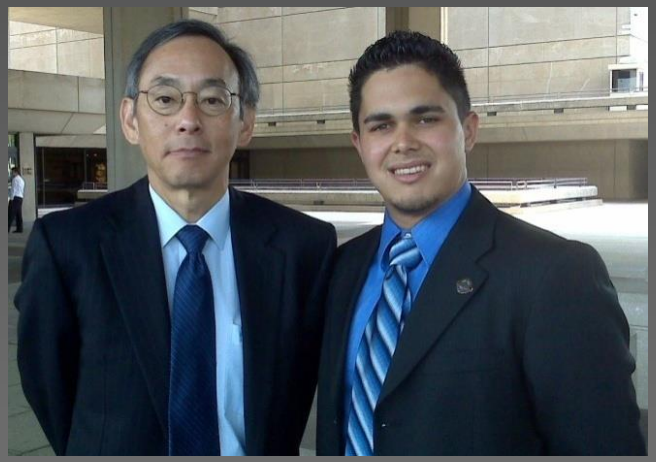
DOE Fellows at WM Conference

WM Student Posters Sessions

Panel Member – Young Professionals

DOE Fellows Lecture Series

Internships – DOE HQ



Internships – DOE Nat. Labs

Internships – DOE Sites

Savannah River

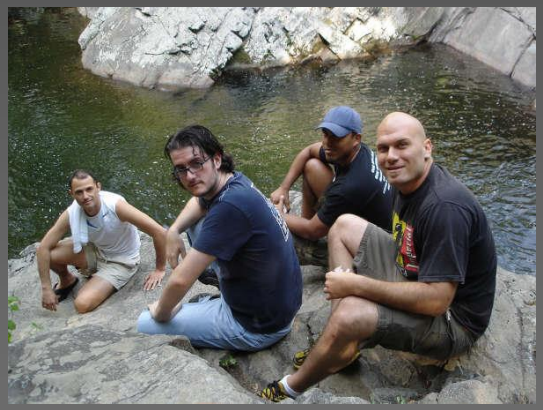
NuVision Engineering Mooresville, NC

Columbia - Energy Richland, Washington

DOE Fellows Poster Exhibition

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

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FIU Science and Technology Workforce Development Initiative

DOE Fellows Video

- The DOE Fellows Experience Video