

FIU-DOE Mid-Year Review 2014

Monday, Feb 24 th	Tuesday, Feb 25 th	Wednesday, Feb 26 th	Thursday, Feb 27 th	Friday, Feb 28 th
<p>10:00 A.M. – 11:00 A.M. Presentation - D&D and Environmental Management IT Research (FIU Project 4)</p> <p>11:00 A.M. – 12:00 P.M. Discussion of research area in support of EM</p>	<p>1:00 P.M. - 2:00 P.M. Presentation - High Level Waste/Waste Processing Research (FIU Project 1)</p> <p>2:00 P.M. - 3:00 P.M. Discussion of research area in support of EM</p>	<p>2:00 P.M. - 3:00 P.M. Presentation - Workforce Development and Training (FIU Project 5)</p> <p>3:00 P.M. - 4:00 P.M. Discussion of research area in support of EM</p>	<p>10:00 A.M. - 11:00 A.M. Presentation - Soil & Groundwater Research – Oak Ridge (FIU Project 3)</p> <p>11:00 A.M. - 12:00 P.M. Discussion of research area in support of EM</p> <p>2:00 P.M. - 3:00 P.M. Presentation - Soil & Groundwater Research – Hanford (FIU Project 2)</p> <p>3:00 P.M. - 4:00 P.M. Presentation - Soil & Groundwater Research – SRS (FIU Project 2)</p>	<p>10:00 A.M. - 12:00 P.M. Wrap-up: Discussion of DOE-FIU Cooperative Agreement</p>





Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY

DOE-EM Cooperative Agreement FIU Year 4 Mid-Year Review

Presented: February 28, 2014
to the U.S. Department of Energy
by Dr. Leonel Lagos, PhD, PMP®
Dr. Dwayne McDaniel, PhD, PE
Dr. Georgio Tachiev, PhD, PE
Dr. Yelena Katsenovich

*Worlds
Ahead*

Advancing the research and academic mission of Florida International University.



Florida International University

FIU, is a vibrant, 52,000 student-centered public research university located in Miami, Florida. FIU is worlds ahead in its commitment to learning, research, entrepreneurship, innovation, and creativity so that graduates are prepared to succeed in a global market.

FIU is among the largest Hispanic-Serving Institutions in the U.S., designated a Minority-Serving Institution.

As a top-tier research institution, FIU emphasizes research as a major component in its mission.

FIU averages over \$100 million in research annually.

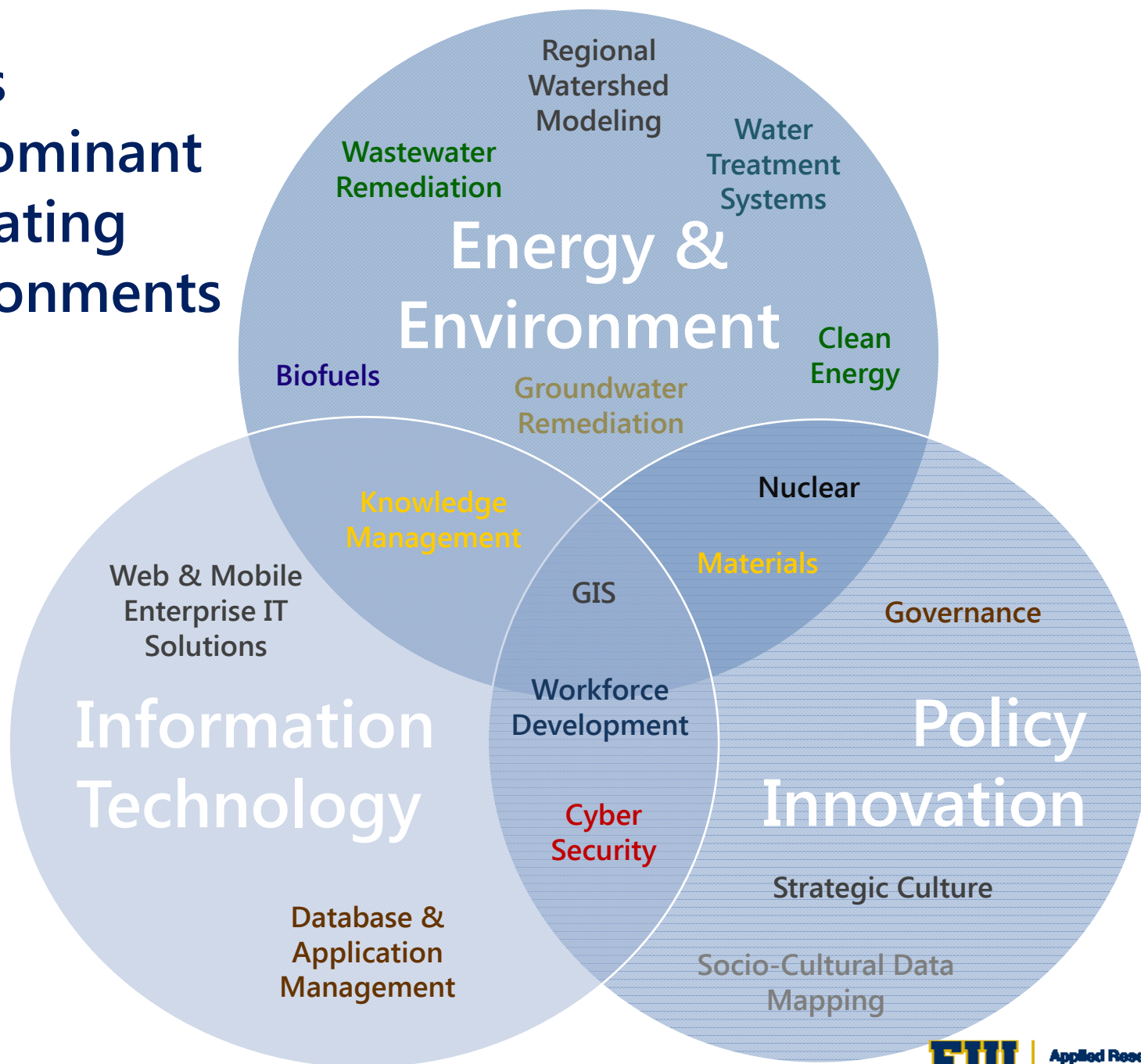


FIU's Applied Research Center (ARC) Serves as a Portal to FIU

- Founded in 1995, ARC has executed over \$94 million in research with DOE, DoD, other Federal and State Agencies as well as private industry.
- ARC's Portal Concept provides ease of access to FIU's Colleges and Centers to facilitate collaborative research.
- ARC's mission is to provide world-class R&D and technology solutions to clients.
- ARC's multicultural, multilingual staff are client service-oriented professionals and include Project Management Professionals (PMP®) and Professional Engineers (PE).
- Successful Workforce Development Programs.

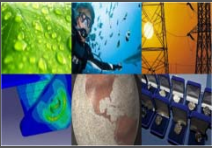


ARC's Predominant Operating Environments



FIU

Applied Research Center
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FIU

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The Applied Research Center at Florida International University
would like to thank its domestic sponsors!





ARC's Technical & Workforce Development Support to DOE-EM

- DOE-FIU Cooperative Agreement 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)



Applied Research Center Facilities

Large Scale Testing Facility: This outdoors facility is available to conduct large scale demonstration of technologies



Radiological Laboratory: This laboratory is equipped with state-of-the-art glove boxes, a three-stage HEPA-activated charcoal filtration system, fume hood, and a shielded enclosure for conducting studies on any material emitting alpha, beta, or gamma radiation



Applied Research Center Facilities

Soil & Groundwater Laboratory:

Research on fate, and transport of contaminants in soil, sediments, water, and biota; water and wastewater treatment; and soil sorption analysis



Analytical Chemical Laboratory: Analytical Chemistry (wet chemistry) laboratory supports applied environmental research



Applied Research Center Facilities

Robotic & Sensors Laboratory:

Development of innovative cleanup, monitoring, security, maintenance, and surveillance technologies for contaminated facilities



Multifunction Assessment Facility: This 8,000-square-foot high-bay building is the primary laboratory resource for large scale applied research activities and technology prototyping and testing



Applied Research Center Facilities

DOE Modeling & Simulation / GIS Research Lab

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U.S. Department of Energy

FIU Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY



Modeling, Simulation and GIS Research Laboratory: This laboratory hosts servers and workstations to support soil & groundwater, waste processing, and GIS research work.

Technology Development & Evaluations





FIU-DOE Cooperative Agreement

Project 1: Chemical Process Alternatives for Radioactive Waste (Dr. Dwayne McDaniel)

Project 2: Rapid Deployment of Engineered Solutions to Environmental Problems (Dr. Yelena Katsenovich)

Project 3: Remediation and Treatment Technology Development and Support (Dr. Georgio Tachiev)

Project 4: Waste and D&D Engineering and Technology Development (Dr. Leonel Lagos, Mr. Himanshu Upadhyay)

Project 5: DOE-FIU Science and Technology Workforce Development Initiative (Dr. Leonel Lagos)



Major Accomplishments – Graduate Degrees

DOE-EM based applied research on the Cooperative Agreement projects are the basis of master's degree theses and PhD dissertations completed or currently in progress (DOE Fellows & graduate students):



Major Accomplishments – Graduate Theses / Dissertations

- Nantaporn Noosai, PhD Dissertation, *Developing thermodynamic database of mercury species and integrating interactions within a flow and transport model* (Fall 2013).
- Jose Matos, Masters Thesis *Development of Improved Bodies for a Peristaltic Crawler for Unplugging of Hanford Waste Transfer Pipelines*, Mechanical Engineering (Summer 2013)
- Eric Inclan, Masters Thesis *The Development of a Hybrid Optimization Algorithm for the Evaluation and Optimization of the Asynchronous Pulsing Unit*, Mechanical Engineering (Summer 2013)
- Jamie Muldrich, Masters Thesis *Development of a Model for Fluid-Structure Interaction using the Meshfree FEM and the Lattice Boltzmann Method*, Mechanical Engineering (Fall 2013)



Major Accomplishments – Graduate Theses / Dissertations

- Elicek Delgado Cepero, Master's Thesis, *Structural Health Monitoring Inside Concrete and Grout Using the Wireless Identification Sensing Platform (WISP)*, Electrical Engineering (Spring 2013)
- Sainath Munavalli, Master's Thesis, *Structural Data Acquisition Using Sensor Network*, Electrical Engineering (Spring 2013)
- Mariela Silva, Master's Thesis, *SharePoint Based Secured Collaboration System*, Engineering Management (Fall 2013)
- Revathy Venkataraman, Master's Thesis, *Performance Evaluation of Mobile Applications with KMIT Technology Web Services using Windows Communication Foundation*, Information Technology (Spring 2014)
- Sandhya Appunni, Master's Thesis, *Design and Implementation of Disaster Event Information System*, Computer Science (Spring 2014)



Major Accomplishments – Peer Reviewed Journal Publications - 2013

- Gudavalli, R.P.; Katsenovich, Y.; Wellman, D.; Lagos, L.; and Tansel, B. (2013). "Quantification of kinetic rate law parameters for the dissolution of sodium meta-autunite as a function of aqueous bicarbonate concentration." *Environmental Chemistry*, 10(6),p. 475-485.
- Gudavalli, R., Katsenovich, Y. Wellman, D., Idarraga, M., Lagos, L., Tansel, B. (2013). "Comparison of the Kinetic Rate Law Parameters for the Dissolution of Natural and Synthetic Autunite in the Presence of Aqueous Bicarbonate Ions." *Chemical Geology*, p 299-309.
- Malek-Mohammadi, S., Tachiev, G., Bostick, K., and Daniel, A. (2013). "Migration of VOC Plume in the Subsurface Domain at the Y-12 National Security Site." Accepted for publication in the *Journal of Remediation*, Winter 2013 issue.
- Katsenovich, Y, Carvajal, D., Guduru, R., Lagos, L., Li, C. (2013). Assessment of the Resistance to Uranium (VI) Exposure by *Arthrobacter* sp. Isolated from Hanford Site Soil, *Geomicrobiology Journal*, 30(2), 120-130.



Major Accomplishments – Peer Reviewed Journal Publications - 2012

- Carvajal, D., Katsenovich, Y., Lagos, L. (2012). “The Effects of Aqueous Bicarbonate and Calcium Ions on Uranium Biosorption by Arthrobacter G975 Strain.” *Chemical Geology*, 330-331, 51–59.
- Malek-Mohammadi, S., Tachiev, G., Cabrejo, E., and Lawrence, A. (2012). "Simulation of flow and mercury transport in Upper East Fork Poplar Creek, Oak Ridge, Tennessee." *Remediation Journal*, 22(2), 119–131.
- Li, Y., Yin, Y., Liu, G., Tachiev, G., Roelant, D., Jiang, G., and Cai, Y. (2012). "Estimation of the Major Source and Sink of Methylmercury in the Florida Everglades." *Environ. Sci. Technol.*, 46(11), 5885–5893.
- Dickson, D., Liu, G., Lib, C., Tachiev, G., Cai, Y. (2012). "Dispersion and Stability of Bare Hematite Nanoparticles: Effect of Dispersion Tools, Nanoparticle Concentration, Humic Acid and Ionic Strength." *Science of the Total Environment*. 419(1). 170–177.
- Katsenovich, Y., Carvajal, D., Wellman, D., Lagos, L. (2012). “Enhanced U(VI) release from autunite mineral by aerobic Arthrobacter sp. in the presence of aqueous bicarbonate.” *Chemical Geology* 308–309, 1–9.
- Öztürk, Z., Tansel, B., Katsenovich, Y., Sukop, M., and Laha, S. (2012). “Highly organic natural media as permeable reactive barriers: TCE partitioning and anaerobic degradation profile in eucalyptus mulch and compost.” *Chemosphere*, 89(6), 665-671.



FIU Project 1: Dr. Dwayne McDaniel

Chemical Process Alternatives for Radioactive Waste



Project Tasks and Scope

Task 2 Pipeline Unplugging and Plug Prevention

- develop novel technologies that can be utilized to remove plugs formed in HLW pipelines
- computational simulation and evolution of HLW pipeline plugs

Task 17 Advanced Topics for Mixing Processes

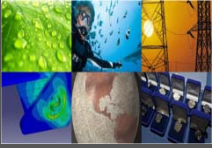
- develop a multiple-relaxation time, lattice Boltzmann model for high-density ratio multiphase flows

Task 18 Technology Development and Instrumentation Evaluation

- evaluation of FIU's SLIM for rapid measurement of HLW solids on tank bottoms (new)
- development of inspection tools for DST primary tanks (new)

Task 19 Pipeline Integrity and Analysis

- pipeline corrosion and erosion evaluation (new)



Major Accomplishments

Task 2 Pipeline Unplugging and Plug Prevention

- Resolved fatigue issue related to the front and back cavities (made of rubber) – redesigned and manufactured rims.
- Conducted testing on an engineering scale testbed that was dry and fully flooded. The reduction in friction force due to flooding will have a significant impact on the overall distance the crawler can travel.
- Moved pneumatic valves closer to crawler – increase crawler speed
- Conducted parametric testing on an engineering scale test bed (APS) to determine optimal parameters for unplugging.
- Matched CFD models to experimental data to establish a base model for predicting performance at even longer pipe lengths
- Developed CFD multiphase models (solid/liquid) to establish a baseline for simulating settled solids as a function of solid density, solid volume fraction and particle size.
- Models compared well with experimental results and critical velocity correlations . Models also demonstrated the influence of bends on settling characteristics.



Major Accomplishments

Task 17.1 Multiple-Relaxation Time, Lattice Boltzmann Model for High-Density Ratio Multiphase Flows

- Developed a parallelized version of the 3D MRT LBM using MPI. This will allow the code to be applied to larger domains, significantly improving its applicability.
- Developed a method to implement non-Newtonian characteristics in the LBM code. The method will allow for the modeling of Bingham plastic fluids commonly found in Hanford tank waste.

Task 18.1 Evaluation of FIU's Solid-Liquid Interface Monitor for Rapid Measurement of HLW Solids on Tank Bottoms (new)

- Evaluated SLIM and its operational parameters for its ability to scan at intervals significantly shorter than what it was designed for.
- Developed a lab scale testbed to determine the effects of accuracy and scan time based on the operational parameters.



Major Accomplishments

Task 18.2 Development of Inspection Tools for DST Primary Tanks (new)

- Compiled information of existing efforts for inspection of AY-102 tank bottom. This includes previous inspection video of the tank bottom and refractory as well as design concepts from other possible vendors.
- After numerous discussions with Hanford engineers, we proposed a design concept and are currently in the process of developing a simulation to provide a proof -of-concept.

Task 19.1 Pipeline Corrosion and Erosion Evaluation (new)

- Collected and evaluated data for a number of primary and secondary encasements. This includes SN-285, SN-286, SN-278, SL-509, SL-510, SL-609, SL-610 and PW-4531. Additionally a number of jumper are also being evaluated.
- Data from the lines evaluated have shown little to no erosion/corrosion based on minimum and maximum manufacturing tolerances.



Conferences/Publications

Waste Management 2014

Professional Papers/Posters

- *Computational Fluid Dynamics Modeling of High Level Waste Plug Formation*
- *Experimental Testing of Innovative High-Level Waste Pipeline Unplugging Technologies*

Student Posters

- *Innovative High-Level Waste Pipeline Unplugging Technologies for Hanford Site (Asynchronous Pulsing)*, Alexandra Fleitas (DOE Fellow)
- *Rapid Imaging of Settled Solids in Hanford HLW Staging Tanks*, Dayron Chigin (DOE Fellow)
- *Computational Simulation and Evolution of High-Level Waste Pipeline Plugs*, Deanna M. Moya (DOE Fellow)
- *U.S. Low Level and Mixed Low Level Waste Treatment Technology Identification*, Gabriela Vazquez (DOE Fellow)
- *Analysis of Life Expectancy for Waste Transfer Lines Located at Hanford Site*, Jennifer Arniella (DOE Fellow)
- *Computational Fluid Dynamics Simulations of Fluid Transients in a Pipeline at Hanford Site*, Michael Abbott (DOE Fellow)
- *GPU Accelerated Lattice-Boltzmann Method for Fluid Flows in Nuclear Waste Tanks at Hanford Site*, Sasha Philius (DOE Fellow)
- *Engineering Scale Pipeline Unplugging Testing Using the Improved Peristaltic Crawler System for Removal of High Level Waste Plugs at Hanford Site Pipelines*, Carmela Vallalta (DOE Fellow)



Project 1 Tasks for FY14 (FIU Year 5)

Task 2 - Pipeline Unplugging and Plug Prevention

- Development of Alternative Unplugging Technologies
 - Support as requested for deployment at Sites
- Computational Simulation and Evolution of HLW Pipeline Plugs
 - Continue the development of a multiphysics model aimed at predicting the formation of plugs with and emphasis on pipeline geometry



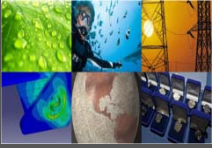
Project 1 Tasks for FY14 (FIU Year 5)

Task 17 - Advanced Topics for Mixing Processes

- Collaborate with Joel Peltier of Bechtel and Rod Rimando to support CFD efforts at WTP
 - Re-scope LBM objective for addressing technical gaps in existing CFD code for application at WTP.

Task 18 - Technology Development and Instrumentation Evaluation

- Evaluation of FIU's SLIM for Rapid Measurement of HLW Solids on Tank Bottoms
 - Continue evaluating SLIM with simple simulants up to 20% solids. If successful evaluate SLIM with more complex mixtures, varying in particle density and diameter.
- Development of Inspection Tools for DST Primary Tanks
 - Develop a first prototype to demonstrate the concepts of operation. Validate in a simple lab-scale test bed. Make modifications to design based on materials and parts available.



Project 1 Tasks for FY14 (FIU Year 5)

Task 19 - Pipeline Integrity and Analysis

- Pipeline Corrosion and Erosion Evaluation
 - Continue evaluating data from various jumpers. Develop tools to assist in the prediction of the life expectancy and compare with previous analyses to generate correlations between data sets.
- Evaluation of non-Metallic Components in the HLW Transfer System (proposed)
 - Experimentally test hose-in-hose lines, seals and gaskets when exposed to three of four primary stressors – temperature, pressure and chemistry.



FIU Project 2: Dr. Yelena Katsenovich

Rapid Deployment of Engineered Solutions for Environmental Problems



Project Description

Task 1.1

- Vadose zone (VZ) remediation is a significant challenge; in arid regions, the VZ can be very thick.
- Technology development needs deeper insight into important remedial and fate and transport processes of contaminants.
- FIU is investigating U(VI) contamination in the VZ of the Hanford 200 Area to reduce contaminant movement to groundwater below levels requiring control.
- Injection of reactive gases such as NH_3 is a new technology to decrease U(VI) mobility in the VZ.



Project Description

Task 1.1

- The injection of NH_3 causes
 - formation of ammonia hydroxide (NH_4OH)
 - increase in pH
 - dissolution of Si and Al from soil minerals
- The subsequent decrease of pH to ambient conditions
 - results in co-precipitation of U(VI) with mobilized Si and other constituencies released from soil minerals.
- This can potentially control the mobility of U(VI) since co-precipitated contaminants are less available for migration.



Project Description

Task 1.2

- Bacteria is an important environmental factor affecting the stability of soil minerals.
- FIU is investigating the effect of HCO_3^- on the bacteria-uranium interaction.
- This data supplements autunite mineral microbial dissolution studies using *Arthrobacter* strains commonly found in Hanford Site soil.



Project Description

Task 2

- Investigating the hypothesis that some uranium in the SRS F/H area treatment zone is bound to colloidal silica.
- Studies if any synergy exists between silica and humic acid (HA).
 - a major component of soil organic matter and an important ligand affecting the mobility behavior of radionuclides in the environment.
- A microcosm study is investigating if contaminants remain sequestered after the ARCADIS demonstration of *in situ* molasses addition for U(VI) remediation via the Enhanced Anaerobic Reductive Precipitation (EARP) process at the SRS F-Area.
 - mineralogical changes during reduction and re-oxidation processes to verify the viability of the technology.



Project Description

Task 2

- **Task 2.1 (new): FIU's support for groundwater remediation at SRS F/H Area** - This task investigates
 - Whether a base solution of dissolved silica can be used to replace the carbonate base previously used to increase the pH of the treatment zone.
 - Whether any synergy exists between humic acid (HA) and colloidal silica that can influence the behavior of U(VI).
- **Task 2.2 (new): Monitoring of U(VI) bioreduction after ARCADIS demonstration at F-Area**
 - Investigates if phases of reduced iron (siderite and pyrite) would arise in the reducing zone.
 - Evaluates soil samples for re-oxidation.



Major Accomplishments

Task 1.1

- Finalized experiments to evaluate the removal of elements from the U(VI)-Al-Si-HCO₃-Ca solution mixtures.
- Summarized observations on U(VI) trapping in Si/Al-rich gels and possible mechanisms responsible for U(VI) removal in the FIU Year End Report.
- Stability of U-bearing precipitates is the next major question in the experimental plans.



Major Accomplishments

Task 1.2

- AFM Imaging
 - Images, roughness analyses, adhesion forces, and profile plots
- Viability of cells
 - Via live/dead assay
 - Via plates



Major Accomplishments

Task 2.1

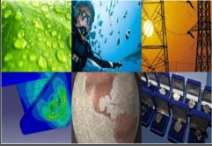
- Initiated investigation to find possible synergy between humic acid and colloidal silica on U(VI).
- Created an experimental matrix involving colloidal silica, humic acid, and naturally present sediment.
- Determined the desired concentrations and ratios of each of constituents to simulate the U(VI) sorption process.



Major Accomplishments

Task 2.2

- Design Microcosm experiment that mimics Enhance Anaerobic Reductive Precipitation (EARP) implementation technology performed at Savannah River Site by ARCADIS
- Completed two batches of samples
- Designed re-oxidation period with two oxygenated environments
- Completed XRD Analysis for original samples



Major Accomplishments

- Manuscript in preparation for a peer-reviewed journal:
 - Gudavalli, R.P., Katsenovich, Y., Wellman, D., Lagos, L., Effect of high concentrations of bicarbonate on the dissolution of calcium meta-autunite.
- Submitted two proceeding papers to WM14. Both papers were accepted for oral presentations.
- 4 student posters prepared for the WM14 conference.
- DOE Fellow Hansell Gonzalez has been accepted to the Ph.D. program. 2 PhDs, 4 students on the master level and one undergrad are currently performing research based on the project tasks.



Future Work for Current Year - Task 1

- Continue with isopiestic measurements of mixed samples containing Na-Si-Al-Ca-U-NO₃-Co₃ ions.
- Continue with analysis to characterize the U-bearing phases:
 - Elevated uranium content
 - Evaluating methods of reducing nitratine formation
- Complete processing of images for roughness, adhesion forces, and profile plots.
- Complete viability assessment of G968 cells via Live/Dead assay.
- DOE Fellow Paola Sepulveda to complete MS thesis on these results.



Future Work for Current Year - Task 2

- Complete set of experiments using 10 ppm of HA.
- Evaluate data and create graphical representation of U (VI) removal data of various batches as a function of pH.
- Initiate batch experiments using 50 ppm of HA for the pH range from 3 to 8.
- Perform XRD analysis for remaining samples.
- Continue with identifications of minerals and analysis of XRD results.



Project 2 Tasks for FY14 (FIU Year 5)

Task 1

- Continue to examine the water activity of mixed uranium-bearing samples containing Na-Si-Al-Ca-U-NO₃ ions at various ratios to determine the occurrence of solid-liquid transitions in the multicomponent salt systems.
- Finalize characterization of U-bearing precipitates and initiate sequential liquid extractions of U phases to evaluate changes in U leaching.
- Evaluate the effect of nutrients from the Columbia River water and nutrient stress responses on bacteria and its effect on the dissolution of the U solid phase.



Project 2 Tasks for FY14 (FIU Year 5)

Task 2

- Examine the effect of major GW constraints such as pH and the presence of F/H Area sediments on the U(VI) removal.
- Determine if any synergy exists between complexing agents such as humic acid and sodium silicate when used together in solutions on the U(VI) removal.
- Characterize dried precipitates via SEM-EDS and XRD and monitor U association with sample constituencies: organic carbon such as humic acid or silica.



FIU Project 3: Dr. Georgio Tachiev

Remediation and Treatment Technology Development



Project Description

- Modeling F & T of contaminants
 - Surface (rivers & overland flow)
 - Saturated/unsaturated subsurface (groundwater)
- Green Sustainable Remediation assessment
 - Provide analysis of remediation strategies using sustainable methods to reduce environmental and social impacts of remedial cleanup and closure activities in a cost-effective way.
 - Contributing to meeting greenhouse gas (GHG) goals, reducing toxic air emissions, Reducing polluting wastewater discharges, Lessening the impact on ecosystems, Reducing waste generation, Reflecting Best Management Practices (BMPs) and good environmental stewardship,
 - Helping to achieve public acceptance, Reducing life-cycle costs, and Demonstrating performance in achieving environmental sustainability goals.
- Geodatabase development
 - Centralized data storage and management



Project Description

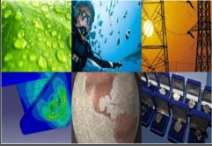
Task 3.1: EFPC Model Update, Calibration, Uncertainty Analysis

Objective

Analysis of coupling between hydrology and Hg transport within context of decreasing risk of D&D activities.

FY13 Scope

- Review of existing Hg thermodynamic database and update for EFPC environmental conditions.
- Integration of Hg thermodynamic database into existing EFPC model.
- Conduct simulations using EFPC model and thermodynamic and kinetic interactions.



Major Accomplishments

Task 3.1: EFPC Model Update, Calibration, Uncertainty Analysis

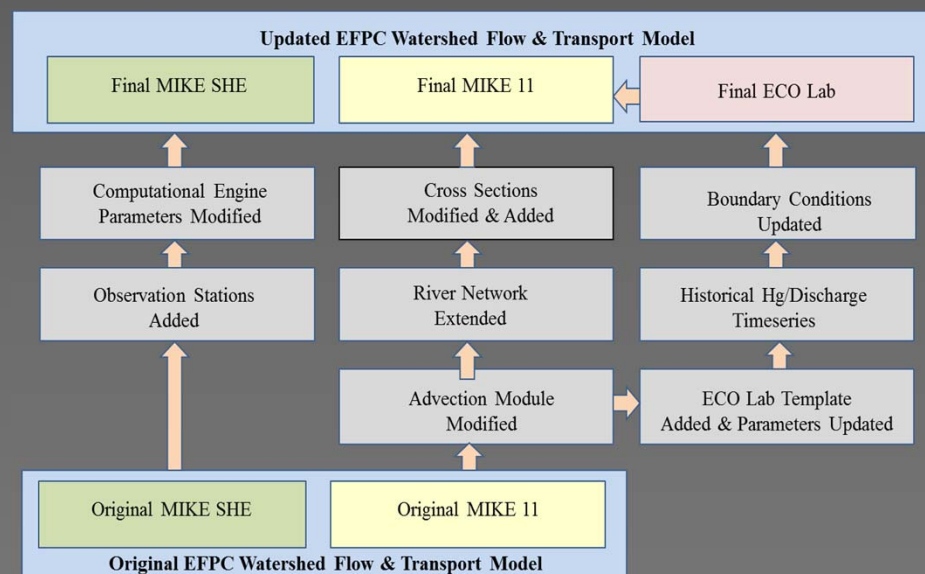
- Developed & calibrated numerical model for hydrology, sediment & Hg transport in UEFPC (1996 to present).
- Reconfigured model to incorporate sedimentation module and extended it to include 52 additional outfalls covering entire EFPC and Bear Creek.
- Performed simulations using range of Manning's numbers, threshold run-off water depths, and drainage coefficients to calibrate flow from 2000 – 2008. MATLAB scripts were used for statistical analysis of observed and computed data.
- Provided DOE with assessment reports on effectiveness of 8 different remedial scenarios.
- Reviewed and updated existing Hg thermodynamic database specific to EFPC environmental conditions & integrated it into flow and transport models already developed for the site.
- Implemented equations in the kinetic solver (ECOLAB) which provides distribution between total-Hg and methyl-Hg species based on observed distribution coefficients (as fraction).
- Conducted preliminary tests to calibrate model using observed ratios of total-Hg and methyl-Hg concs. Initial results showed template predicts ratio between total-Hg and Me-Hg concs.



Major Accomplishments

Task 3.1: EFPC Model Update, Calibration, Uncertainty Analysis

- Reviewed thermodynamic database defining interactions between Hg species.
- Built-in programmable reaction solver extended to provide additional reaction equations based on literature.
- Kinetic equations and constants obtained from literature and implemented in kinetic solver of MIKE SHE/11 model (ECOLAB)
 - Provides distribution between total Hg and MeHg based on observed distribution coefficients (as fraction).





Project Description

Task 3.2: Simulation of NPDES & TMDL Regulated Discharges from Non-Point Sources for EFPC & Y-12

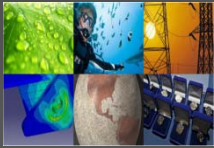
Objective

Use of EFPC model for numerical analysis of contaminant flow and transport within EFPC watershed to determine impact of model parameters on TMDL.

- Ecosystem responses to variations in contaminant loading (changes in external & internal loading in time and space).
- Effect of ecosystem restoration on existing contaminant pools.

FY13 Scope

- Use observed outfall discharges for conducting simulations of entire EFPC watershed and load discharge at Station 17.



Major Accomplishments

Task 3.2: Simulation of NPDES & TMDL Regulated Discharges

- Updated EFPC database with new data from:

- OREIS, USGS, NRCS STATSGO or SSURGO soil databases, and the U.S. EPA MRLC or NALC land cover databases as well as the literature.

- Conducted spatial and temporal analyses to:

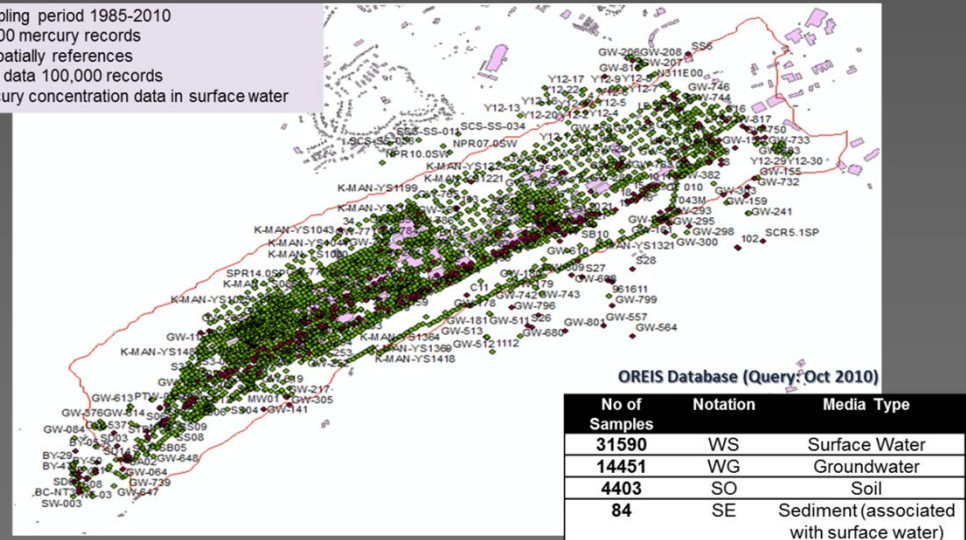
- Identify spatial variations of Hg in EFPC water, soil and sediments.
- Evaluated timing of impairment, potential source loading or other conditions contributing to impairment.
- Investigated effect of rainfall and runoff on Hg conc. in EFPC.

- Conducted comprehensive review of TMDL requirements for EFPC established by EPA and TDEC.

- Submitted report containing:

- WQ criteria and TMDL target
- WQ assessment and deviation from TMDL target
- WQ data analysis and source identification
- Development of flow and load duration curves
- Load allocation analysis

- Sampling period 1985-2010
- 54,000 mercury records
- All spatially references
- Flow data 100,000 records
- Mercury concentration data in surface water



Mercury Concentrations in Soil in the Watershed Model Domain

- Several target load-duration curves developed for EFPC.
- Target load reduction criteria developed using % reduction.
- Model used with newly developed ECOLAB template.
 - Incorporates MeHg into kinetic & thermodynamic eqns.
- Several initial simulations completed and results being reviewed.



Project Description

Task 3.3: Sustainable Remediation and Optimization: Cost Savings, Footprint Reductions, and Sustainability Benchmarked at EM Sites

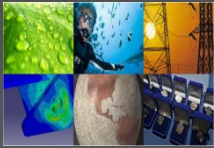
Objectives

NEW task focused on EM pilot studies and software to:

- Evaluate benefit of sustainable remediation practices.
- Quantify environmental footprint of remedial and other alternatives.
- Develop sustainable optimization module for monitoring program analysis on EM sites.

FY13 Scope

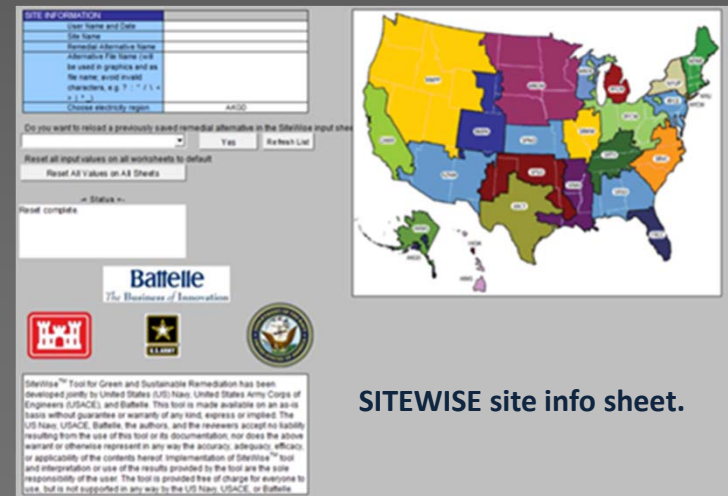
- Benchmarking of current methodology using SITEWISE™.
- Implementation of a SITEWISE™ module for sustainable analysis and optimization of monitoring programs.
- Calibration and Verification of SITEWISE™ monitoring program module.



Major Accomplishments

Task 3.3: Sustainable Remediation and Optimization: Cost Savings, Footprint Reductions, and Sustainability Benchmarked at EM Sites

- Review of geostatistical software including MAROS or GTS.
 - Software used to downsize a compliance monitoring program (i.e., remove wells, analytes, or frequencies).
- Tests conducted with SITEWISE™ monitoring module and results used to calculate the following using MS Excel:
 - Reduction in emissions
 - Energy and water usage
 - Waste generation
 - Accident risk over the program total life cycle
- Initial simulations conducted and data gaps identified.
- Review to determine factors which may significantly impact the GSR metrics, including:
 - Excessive number of monitoring locations
 - Inefficient chemical injection strategy
 - Excess quantity of chemicals used
 - Inefficient power usage by over-sized equipment
 - Installing less energy efficient equipment
 - Unnecessary continuously running equipment
 - Unnecessary unit operations



SITWISE site info sheet.

- Development of optimization strategies for integrated surface and GW models capable of predicting contaminant F & T within site domain to achieve the following:
 - Reduction of the number of monitoring locations
 - Improvement of the chemical injection strategy
 - Reduction of the quantity of chemicals used



Project Description

Task 3.4: Geodatabase Development for Hydrological Modeling Support

Objectives

Develop geodatabase to support FIU's hydrological modeling work at ORR.

FY13 Scope

- Update existing EFPC geodatabase.
- Develop customized Python scripts to enhance database querying capabilities.
- Use existing geodatabase structure developed for EFPC modeling work at OR to create similar databases.



Major Accomplishments

Task 3.4: Geodatabase Development for Hydrological Modeling Support

- Developed enterprise geodatabase to store, process and manage hydrological modeling data derived from FIU's work at ORR. Existing geodatabase being updated with new data .
- Developed customized Python scripts to automate querying and geoprocessing of data and generation of maps and reports.
- Evaluated free/open source GIS software for viewing, querying and sharing project-derived data with DOE & site contractors.
- Coordinating with ARC's IT team for publishing model data on the Web. (Project 4 – Task 5: Cyber Security Compliance and Deployment of Environmental Contamination and Remediation Models)
 - Upgraded ArcGIS software to the latest version and migrated geodatabase to a secure server in order to implement some of the security protocols being investigated.
 - Investigating the programming/scripting necessary for customization of the web viewers for visualization of project data and to determine how to implement the necessary security protocols.
 - Training and mentoring student (DOE fellows) on these aforementioned tasks.
 - Designed preliminary web interface for deployment on the KM-IT platform.



Preliminary design for web interface



Project 3 Tasks for FY14 (FIU Year 5)

Task 3.1: EFPC Model Update, Calibration, Uncertainty Analysis

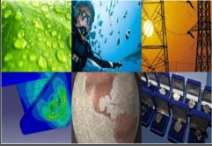
- **Subtask 3.1.1: Model update with additional reaction kinetics.**
 - This subtask will focus on implementation of reaction kinetics for methylmercury species in the hydrological and transport model.
- **Subtask 3.1.2: Update of EFPC data from OREIS, USGS, and other sources.**
 - Timeseries; Spatial Data; Subsurface geologic conditions; Contamination data
- **Subtask 3.1.3: Recalibration and validation of updated model.**
 - Model adjustments to cover the new time period.
 - Conducting simulations for selected calibration and validation periods.
 - Statistical analysis of observed data and development of timeseries, probability exceedance curves, and probability distribution models of flow and concentration.
- **Subtask 3.1.4: Web access to observed and computed data.**



Project 3 Tasks for FY14 (FIU Year 5)

Task 3.2: Simulation of NPDES & TMDL Regulated Discharges from Non-Point Sources for EFPC & Y-12 NSC

- **Subtask 3.2.1: Simulation of the EFPC flow and transport.**
 - Analysis of TMDL- and NPDES-regulated discharges using updated model.
- **Subtask 3.2.2: Water quality assessment and TMDL target analysis.**
 - Analysis of target loads for the TMDL analyses.
 - Calculation of daily loads for specified locations.
 - Analysis of flow exceedance from computed data along EFPC for entire watershed and selected stations with observed data.
 - Analysis of contaminant load exceedance and comparison with TMDL set criteria for selected stations along EFPC.
- **Subtask 3.2.3: Investigation of additional contaminants of concern.**
 - Continued work with ORR to determine opportunities where models can be utilized onsite.



Project 3 Tasks for FY14 (FIU Year 5)

Task 3.3: Sustainable Remediation and Optimization: Cost Savings, Footprint Reductions, and Sustainability Benchmarked at EM Sites

- **Subtask 3.3.1: Benchmarking of current methodology using SITEWISE™.**
 - Use of SITEWISE™ for benchmarking at EM field sites with pilot studies where cost benefit demonstrated.
- **Subtask 3.3.2: Implementation of a SITEWISE™ module for sustainable analysis and optimization of monitoring programs.**
- **Subtask 3.3.3: Calibration and verification of the SITEWISE™ monitoring program module.**
 - FIU will collaborate with other federal agency experts and their contractors to assure benchmark studies for calibration and verification of this module.
- **Subtask 3.3.4: Development of monitoring program module.**
 - FIU will work with EM to create a monitoring program module using a GIS interface to improve data import, analysis, and visualization.
- **Subtask 3.3.4: Benchmarking of monitoring program through incorporation of a module to:**
 - Reducing the number of monitoring locations .
 - Improving the chemical injection strategy.
 - Reducing the quantity of chemicals used.
- **Subtask 3.3.5: Web access to observed and computed data.**



Project 3 Tasks for FY14 (FIU Year 5)

Task 3.4: Geodatabase Development for Hydrological Modeling Support

- **Subtask 3.4.1: Update of existing EFPC geodatabase.**
 - Recent OR site monitoring data from OREIS, USGS, NRCS STATSGO/SSURGO, U.S. EPA MRLC or NALC, etc.
- **Subtask 3.4.2: Update of metadata.**
- **Subtask 3.4.3: Web access to observed and computed data.**
 - FIU will take steps to publish project-derived hydrological model data on the web via the secured KM-IT platform.



FIU Project 4:
Dr. Leonel E. Lagos
Mr. Himanshu Upadhyay

**Waste and D&D Engineering
and Technology
Development**



Overview of Project Tasks

Task 1. Waste Information Management System (WIMS)

Maintenance and enhancement of the web-based waste forecasting and transportation system. Integration of a new forecast waste streams on an annual basis.

Task 2. D&D Support to DOE EM for Technology

Innovation, Development, Evaluation, and Deployment – Innovative technologies and methodologies for SRS 235-F. Support to EFCOG and EM-13 on special topics of interest. Development of lessons learned and best practices with EFCOG.



Overview of Project Tasks

Task 3. D&D Knowledge Management Information Tool (D&D KM-IT) – Outreach and training. Application development. Mobile application development. Data and content management. Administration of the system, database, and network.

Task 4. FIU-DOE Research Website – New task to capture and make available all the resulting research documents developed under the CA.

Task 5. Cyber Security Compliance and Deployment of Environmental Contamination and Remediation Models – New task to publish and deploy an environmental contamination and remediation model over the web using ArcGIS.

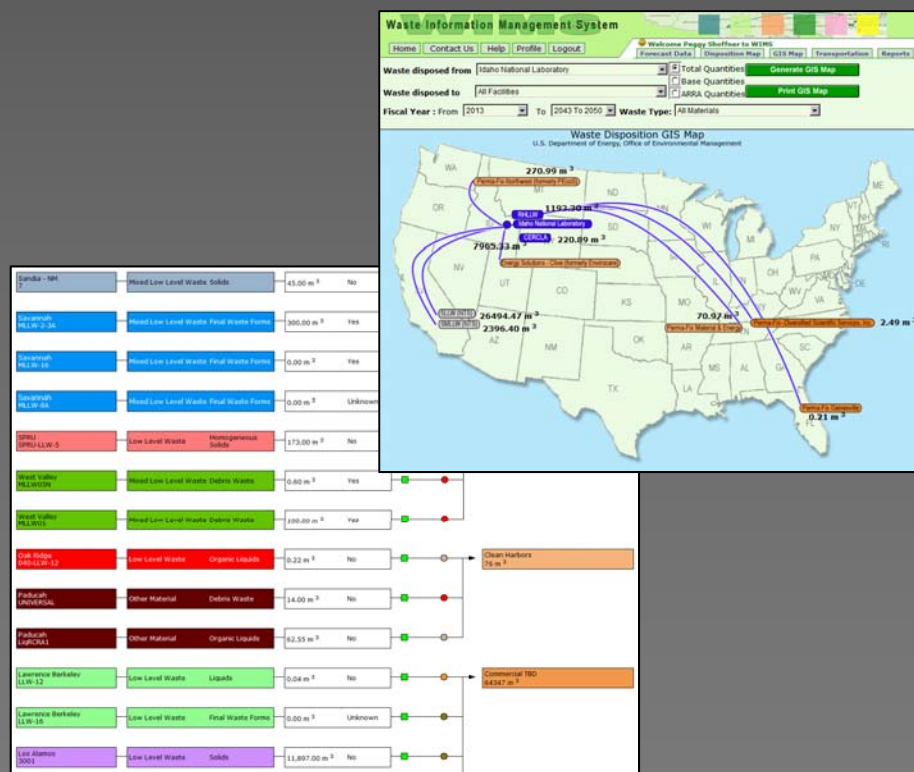


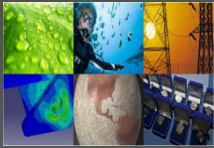
Major Accomplishments

Task 1. Waste Information Management System

Completed integration of 2013 waste forecast and transportation data into WIMS. New 2014 dataset expected in April 2014, will be integrated and deployed on WIMS.

Will present WIMS at WM14 Symposia.





Major Accomplishments

Task 2.1 D&D Support - Decontamination agents/materials for radiological surface contamination

FIU is working with the SRS to investigate the decontamination agents and materials available on the market

Conducted literature search (KM-IT, ALARA Reports, web search, vendor)

Worked with SRS to identify parameters based on application needs

40 strippable/fixative coatings identified

Report sent to Savannah River Site





Major Accomplishments

A decision model for mobile application use is being created to better guide the product end users in the selection of the appropriate products depending on their specific needs and site application.

Preliminary work done on decision model:

Type of Radiation	Surface Properties	Location	Surface Type	Isotopes Involved	Product	% Decon
Beta	Carbon Steel	N/A	Smooth	Plutonium 239	Decon Gel 1101	98%
Type of Radiation	Surface Properties	Location	Surface Type	Isotopes Involved	Product	% Decon
Beta	Plexiglass	N/A	Smooth	Plutonium 239	Decon Gel 1101	53%
Type of Radiation	Surface Properties	Location	Surface Type	Isotopes Involved	Product	% Decon
Beta	Concrete	N/A	Rough	Plutonium 239	Decon Gel 1101	71%



Major Accomplishments

Task 2.2 Support for Aging Infrastructure

FIU is performing a literature search and will also contact each of the major DOE sites to gather information on what efforts are being implemented to:

- a) identify all the excess facilities,
- b) prioritize the maintenance/surveillance activities, and
- c) prioritize D&D when funding becomes available.



D&D at ETP (Oak Ridge)



Major Accomplishments

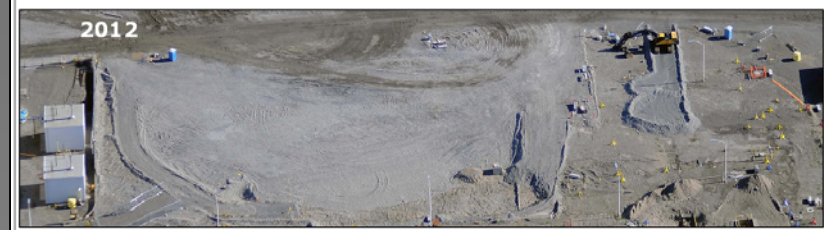
Task 2.2 Lessons Learned / Best Practices

Collaboration with EGCOG in the development of Lessons Learned and Best Practices.

A total of 13 have been developed.

7 final and published on the D&D KM-IT and EFCOG websites.

6 in review process: 2 at DOE HQ, 3 at EFCOG, 1 at FIU.





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



Major Accomplishments

Task 3 D&D KM-IT

Anticipated accomplishments for FIU Year 4 include:

- Wikipedia integration editing/articles
- Presentation of D&D KM-IT at WM14
- Completion of 2 D&D KM-IT workshops

The screenshot shows the D&D KM-IT website. At the top, it says "D&D KM-IT Knowledge Management Information Tool" with a search bar and a "Search" button. Below that are navigation links for "Home", "About", and "Contact Us", and a "Welcome Guest" message with a "Login" button. The main content area features a world map and the text "Powered by the Global D&D Community". Below the map is a grid of yellow buttons for "Hotline", "Technology", "Web Crawler", "Mobile System", "Lessons Learned", "Best Practices", "Picture Video Library", "Document Library", "Specialist Directory", "Vendors", "Collaboration Tools", and "Training". There are also buttons for "U.S. Registration" and "International Registration". A section titled "Additional Features" includes "ICM Crawler Demo of Strippable Coatings", "D&D Program Map Addendum 2013", "ICM Demo at FIU", and "ITSR Module Innovative Technology Summary Report". A "Quick Links" section lists "DOE EM D&D", "ALARA Center", and "EFCOG". At the bottom, there is a "D&D KM-IT is now Mobile" banner and an "Industry News" section with headlines like "Nuclear waste cleanup liability cost up by \$2.4B".



Major Accomplishments

Task 3 D&D KM-IT



11 D&D KM-IT help videos completed in January 2014 for a total of 26 videos on D&D KM-IT to assist users.

Anticipated accomplishments for FIU Year 4 include deployment of:

- Hotline lite mobile application
- Community contribution module
- Popular content displays

m.dndkm.org

D&D KM-IT is now mobile



Mobile Features
You can now use your iPhone, iPad, Blackberry, Android, or Windows smart devices to access the Vendors module and Specialist Directory with more modules on the way. You can easily access a specialist or vendor and place a call directly on your phone with our easy to use Mobile System.

Developed by:
FIU Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY

In Collaboration with:


m.dndkm.org

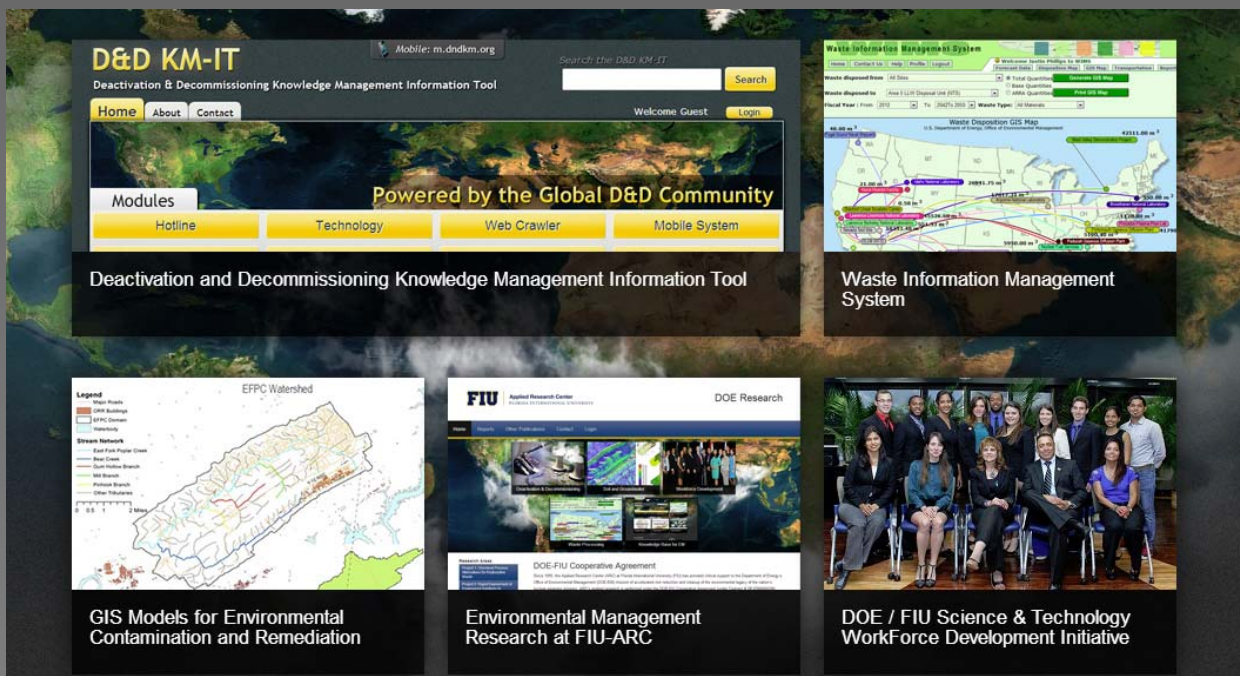




Major Accomplishments

Task 4 Central KB and FIU-DOE Research Website

A simple interface was developed to illustrate the connection between all the independent applications or systems developed for DOE-EM under different projects.



GIS Models for Environmental Contamination and Remediation

Environmental Management Research at FIU-ARC

DOE / FIU Science & Technology WorkForce Development Initiative



Major Accomplishments

Task 4 Central KB and FIU-DOE Research Website

The DOE Research website has been deployed at to provide a centralized location for the research information developed under the Cooperative Agreement and includes technical reports, quarterly progress reports, end of year reports, presentations, journal articles, conference papers, and more.



doereseach.fiu.edu



Major Accomplishments

Task 5. Cyber Security Compliance and Deployment of Environmental Contamination and Remediation Model

This is a new task for FIU Year 4 under which FIU will publish and deploy one environmental contamination and remediation model, developed under Project 3, through the secured KM-IT infrastructure for the research stakeholders.

GIS Models for Environmental Contamination and Remediation

Home About Contact

018 Applications

Surface and Groundwater Air Dispersion Stormwater Geospatial Development

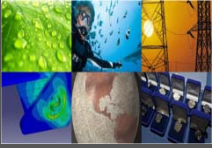
GEO Database Modeling & Development

This area presents the Soil and Groundwater modeling research being performed for the Oak Ridge National Laboratory, Y-12 National Security Complex, and Moab Sites via Numerical modeling of the fate and transport of pollutants of concern.

Environmental Contamination and Remediation Models

The Applied Research Center at Florida International University (ARC-FIU) is a multidisciplinary research unit which provides environmental engineering services that vary in complexity. ARC's projects range from feasibility studies to design alternatives. In all stages, sustainability is the main guiding principle which allows built projects to achieve low infrastructure costs while maintaining highest environmental performance.

FIU Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY



Major Accomplishments

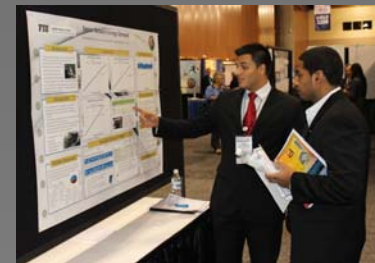
Conference Participation

Professional Presentations of project research to be presented at Waste Management 2014:

- Knowledge Management Information Tool – 2014
- Waste Management System with 2013-14 Waste Streams

Student Posters at Waste Management 2014:

- Investigation of Permanent and Removable Coatings for Decontamination of Savannah River Site (SRS) Plutonium Fuel Form Facility - Mariana Evora (DOE Fellow)
- Native Android Application for Deactivation & Decommissioning Technologies - Pedro Cordon (DOE Fellow)
- Design and Development of Geographical Information System (GIS) Map for DOE Waste Streams - Sandhya Appunni (FIU Graduate Student)
- Performance Evaluation of Mobile Applications with D&D Technology Services – Revathy Venkataraman (DOE Fellow)





Project 4 Tasks for FY14 (FIU Year 5)

Task 1. Waste Information Management System (WIMS)

FIU will maintain and enhance the web-based waste forecasting and transportation system as well as integrate a new forecast data set on an annual basis.



Project 4 Tasks for FY14 (FIU Year 5)

Task 2. D&D Support to DOE EM for Technology Innovation, Development, Evaluation, and Deployment

FIU will assist DOE EM-13 in meeting the D&D needs and technical challenges around the DOE complex. In addition, FIU will also support DOE EM-13 in their interactions with EFCOG on special topics of interest to DOE EM-13 and DOE Complex.

FIU will complete the literature search in support of the SRS-F organic semiconductor thin films for polymer interface and electrostatic applications.

FIU will also further develop a decision-making tool for the use of decontamination agents and materials available on the market for radiological surface contamination.



Project 4 Tasks for FY14 (FIU Year 5)

Task 3: Knowledge Management Information Tool – Application to Deactivation & Decommissioning

FIU will work with DOE EM-13 and EFCOG to maintain and enhance KM-IT; expand the user base via outreach, participation, and collaboration; and pursue potential collaboration with the national and international communities.



Project 4 Tasks for FY14 (FIU Year 5)

Task 4: IT Support to GIS

FIU will provide IT support to the GIS work being performed under Project 3 (Soil & Groundwater Research) for environmental contamination and remediation modeling.



FIU Project 5: Dr. Leonel E. Lagos

DOE-FIU Science and Technology Workforce Development Program



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.*



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



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.



Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY

A collage of six images representing various scientific and technological fields: a green microscopic view of cells, a person in a lab coat and mask working with equipment, a yellow and orange industrial structure, a blue and green microscopic view of a cell, a close-up of a hand holding a small object, and a blue and white image of a keyboard.

**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





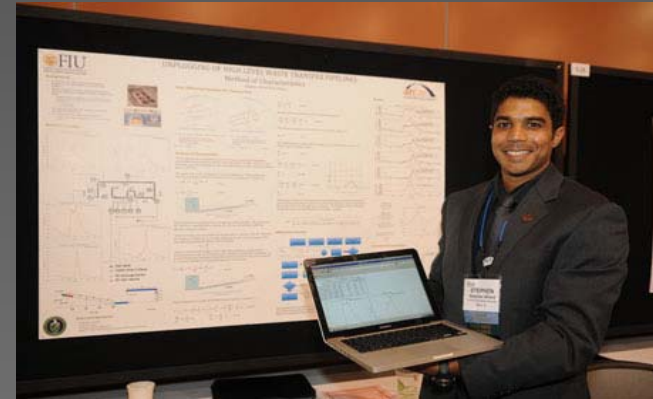
DOE Fellows Induction Ceremony



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 **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 Student Posters Sessions



Panel Member – Young Professionals



81 DOE Fellows Internships Completed



FIU

Applied Research Center
FLORIDA INTERNATIONAL UNIVERSITY



Pacific Northwest
NATIONAL LABORATORY

 **Lawrence Livermore**
National Laboratory


Y-12
National Security Complex



Battelle


SULLIVAN


OAK
RIDGE
National Laboratory



washingtonriver
protectionsolutions



TM

SRNL
SAVANNAH RIVER NATIONAL LABORATORY

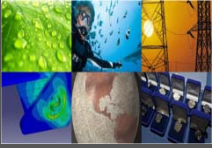
Ahead

Advancing the research and academic mission of Florida International University.



Annual DOE Fellows Poster Exhibition





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)
- Other 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	Characterization of the uranium-bearing products of novel remediation technologies
Joel McGill	M.S.	Civil engineering	The synergy effect of SI and humic acid on the removal of U(VI)
Valentina Padilla	M.S.	Environmental engineering	A microcosm study on mineralogical changes of post molasses injection with SRS F-area sediments
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



Masters & Ph.Ds

Paola Sepulveda-Medina	M.S.	Biomedical Engineering	Investigating the role of a less uranium tolerant strain, isolated from the Hanford site soil, on uranium interaction in polyphosphate remediation technology
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	M.S.	Environmental engineering	Sequestering uranium by in situ subsurface pH manipulation using NH ₃ 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



Masters & Ph.Ds

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.
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)
Nantaporn Noosai	Ph.D.		Developing thermodynamic database of mercury species and integrating interactions within a flow and transport model



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 items like 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 congratulatory message, and a section for 'Featured DOE Fellow' with a bio and program brochure. There is also a 'Message from the Director' and 'Latest News' section.

The Facebook page shows the profile for 'FIU Science and Technology Workforce Development Initiative'. It features a cover photo with the ARC logo and a post titled 'DOE Fellow of the Week - Nada Lima'. The post includes a link to her profile and a congratulatory message from Denise Veronica. Below the post are comments from Denise Veronica and Duro Dale Nadi. The page also has a sidebar with 'Get More Connections' and 'Your Text Here'.



Project 5 Tasks for FY14 (FIU Year 5)

- 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. 2014)
- Conduct Induction Ceremony 2014 (Nov. 2014)
- Participate in WM symposia 2015
- Coordinate efforts with EM-70 to identify employment opportunities for DOE Fellows