



DOE-FIU Cooperative Agreement Annual Research Review – FIU Year 2

Tuesday, September 27, 2022

9:30 - 9:35 am EDT	Kick-Off /Welcoming Remarks (DOE-EM)	Kurt Gerdes (Director, Technology Development) – DOE EM-3.2
9:35 - 9:40 am EDT	Welcoming Remarks (DOE-LM)	Leonel Lagos on behalf of DOE Office of Legacy Management
9:40 - 10:00 am EDT	Projects 4 & 5: STEM Workforce Development and Training	FIU, DOE HQ (EM & LM), SRNL, PNNL, WIPP, SRS, ORP, LBNL, WRPS, INL, Grand Junction
BREAK		
11:00 - 12:00 pm EDT	Projects 4 & 5 (cont'd): STEM Workforce Development and Training	FIU, DOE HQ (EM & LM), SRNL, PNNL, WIPP, SRS, ORP, LBNL, WRPS, INL, Grand Junction
BREAK		
1:00 - 2:30 pm EDT	Project 1: Chemical Process Alternatives for Radioactive Waste	FIU, DOE HQ, PNNL, WRPS, SRNL, SRS
2:30 - 4:00 pm EDT	Project 3: Waste and D&D Engineering & Technology Development	FIU, DOE HQ, SRNL, PNNL, LBNL, INL, ANL

Wednesday, September 28, 2022

10:00 - 11:30 am EDT	Project 2: Environmental Remediation Science & Technology	FIU, DOE HQ, SRNL, PNNL, ORNL, LANL, CBFO
11:30 - 1:00 pm EDT	Wrap Up (FIU Projects 1, 2, 3, 4 & 5)	FIU, DOE HQ (EM & LM)

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PROJECT 5

Long-Term Stewardship of Environmental Remedies: Contaminated Soils and Water and STEM Workforce Development

*Worlds
Ahead*

Advancing the research and academic mission of Florida International University

FIU Personnel and Collaborators

Principal Investigator: Leonel Lagos

Program Manager: Ravi Gudavalli

Faculty/Staff: Anthony Abrahao, Pieter Hazenberg, Angelique Lawrence

DOE LM Fellows: Olivia Bustillo, Eduardo Rojas*, Shawn Cameron

DOE-LM: Carmelo Melendez, Jalena Dayvault, David Shafer

DOE-EM:, Kurt Gerdes, Genia McKinley, Jean Pabon

* Former DOE Fellow



Project Tasks and Scope

TASK 1: USE OF APATITE FOR URANIUM SEQUESTRATION AT OLD RIFLE SITE

TASK 2: CLIMATE RESILIENCY STUDIES FOR LONG-TERM SURVEILLANCE OF DOE-LM SITES

TASK 3: STEM WORKFORCE DEVELOPMENT



Task 1

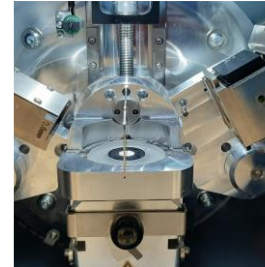
Use of Apatite for Uranium Sequestration at Old Rifle Site



FIU Year 2 Highlights: Hydroxyapatite

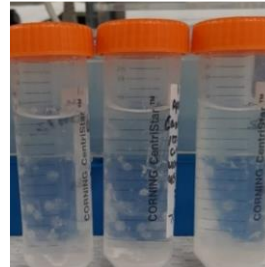


Finalized synthesis and characterization studies of the formation of apatite at varying Ca:Citrate:PO₄ ratios

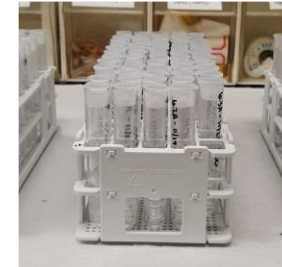


Characterized samples via XRD to confirm successful synthesis of hydroxyapatite through the elemental composition

Synthesized hydroxyapatite at three varying Ca:Citrate:PO₄ ratios to study incorporation and co-precipitation of HA



Collected and analyzed aliquots on ICP-MS/OES for total Ca, P, and U concentrations



	Scenario 1	Scenario 3	Scenario 4
Calcium Concentration	40 mM	80 mM	40 mM
Citrate Concentration	100 mM	100 mM	100 mM
Phosphate Concentration	45 mM	45 mM	90 mM

FIU Year 3 Projected Scope

Analyze dry solids on SEM-EDS for elemental and structural characterization.



Conduct studies to investigate how uranium interacts with HA after it has precipitated and is interacting with flowing groundwater.



Conduct desorption studies to investigate the efficiency of uranium removal.

Task 2

Climate Resiliency Studies for Long-Term Surveillance of DOE- LM Sites



Site Needs

LM's disposal cells are designed to be effective for at least 200 years. However, in 2017 erosion was discovered in the Mexican Hat Disposal Cell in Utah.



Discovered Erosion

The erosion only manifested itself on the surface as slight depressions where the rock cover had subsided into the voids.

Objectives

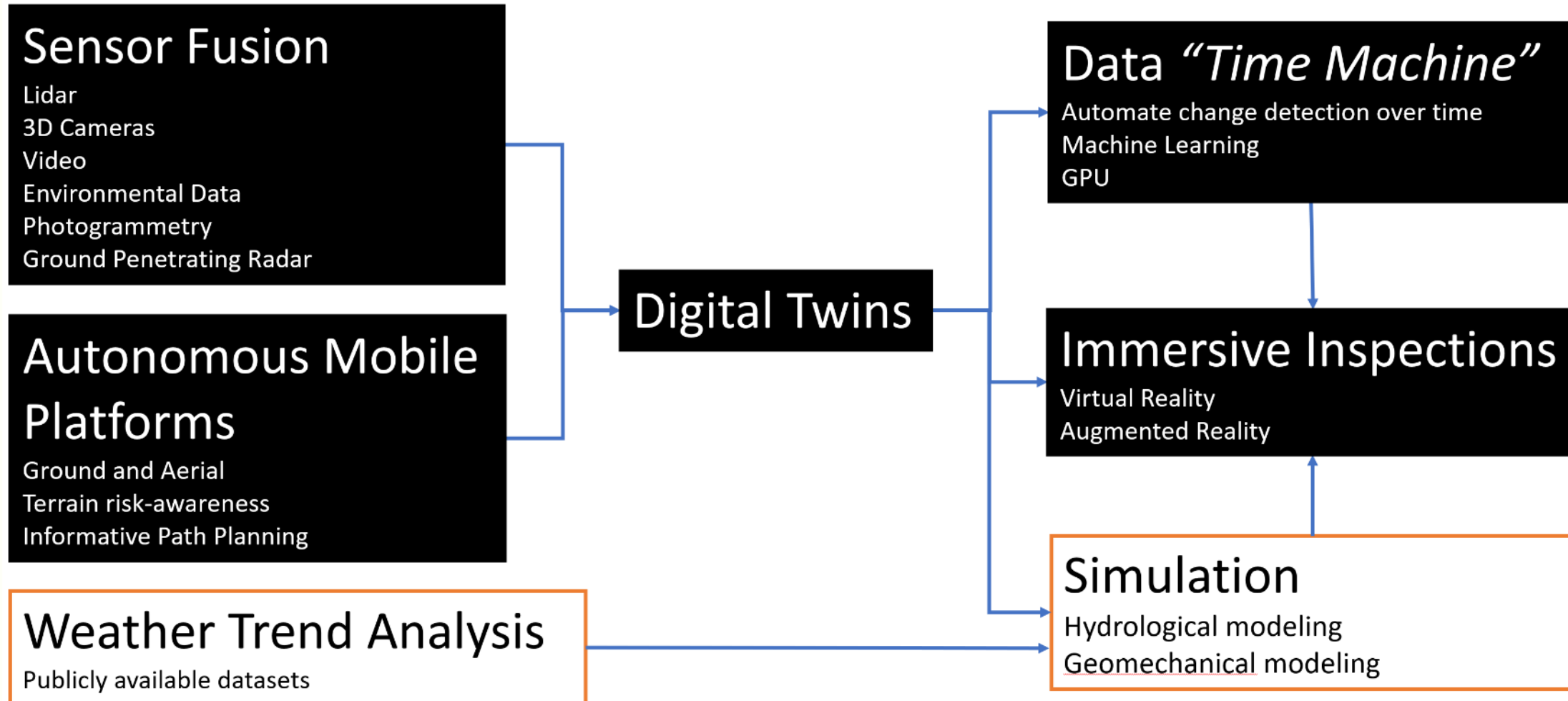
- Develop noninvasive methods to investigate erosion features without risk of radiological exposure in case the radon barrier has been eroded.
- Correlate contributing causes to climate change.



Mexican Hat Disposal Cell at Utah

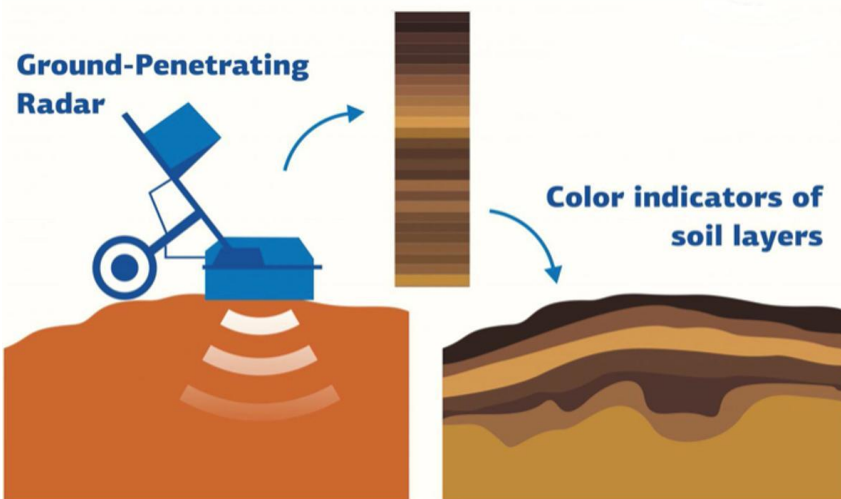
Task 2: Climate Resiliency Studies for Long-Term Surveillance of DOE-LM Sites

FIU Year 2 Research Highlights and Accomplishments

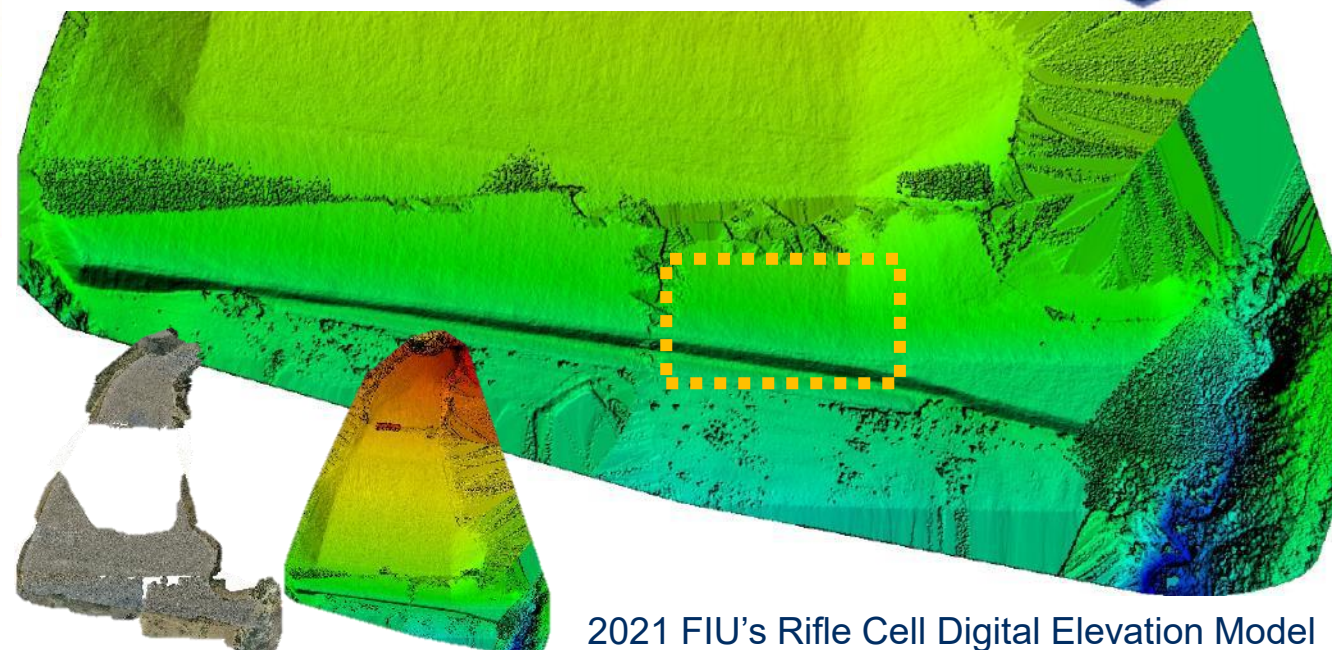


FIU Year 3 Projected Scope

- Integrate and test a GPR unit to an autonomous mobile platform.
- Deploy at Rifle cell during summer 2023.



Ground Penetrating Radar (GPR)





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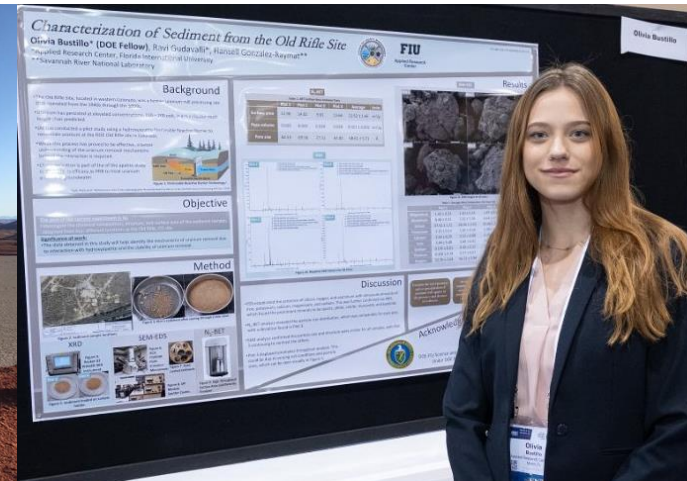
Task 3

STEM Workforce Development



FIU Year 2 Highlights & Accomplishments:

- 3 Fellows supported FIU scientists and engineers in the development of the technical work relevant to LM need
- DOE Fellow, Olivia Bustillo, participated and presented a poster at WM2022
- DOE Fellows and mentors met with DOE-LM collaborators and discussed project progress
- DOE Fellow, Olivia Bustillo, participated in summer internship at Grand Junction
- DOE Fellow, Shawn Cameron, visited Old Rifle Site



FIU Year 3 Projected Scope

- Recruitment of qualified talented FIU minority STEM students
- Engage in DOE-LM research
- Poster exhibition & competition (November 2022)*
- Annual DOE Fellows induction ceremony (November 2022)*
- Summer internships 2023 / Site visits
- Summer internship technical reports
- Conference participation & presentations, including WM2023, AGU
- DOE Fellows lecture series forum





Thank You. Questions?