

## Geologic Disposal Safety Assessment (GDSA) Framework Development

(WBS No. 1.08.01.03.04.05)

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Applied Systems Analysis & Research  
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Spent Fuel and Waste Disposition  
Annual Workshop Group Meeting  
May 17, 2021

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# SFWST GDSA Work Packages

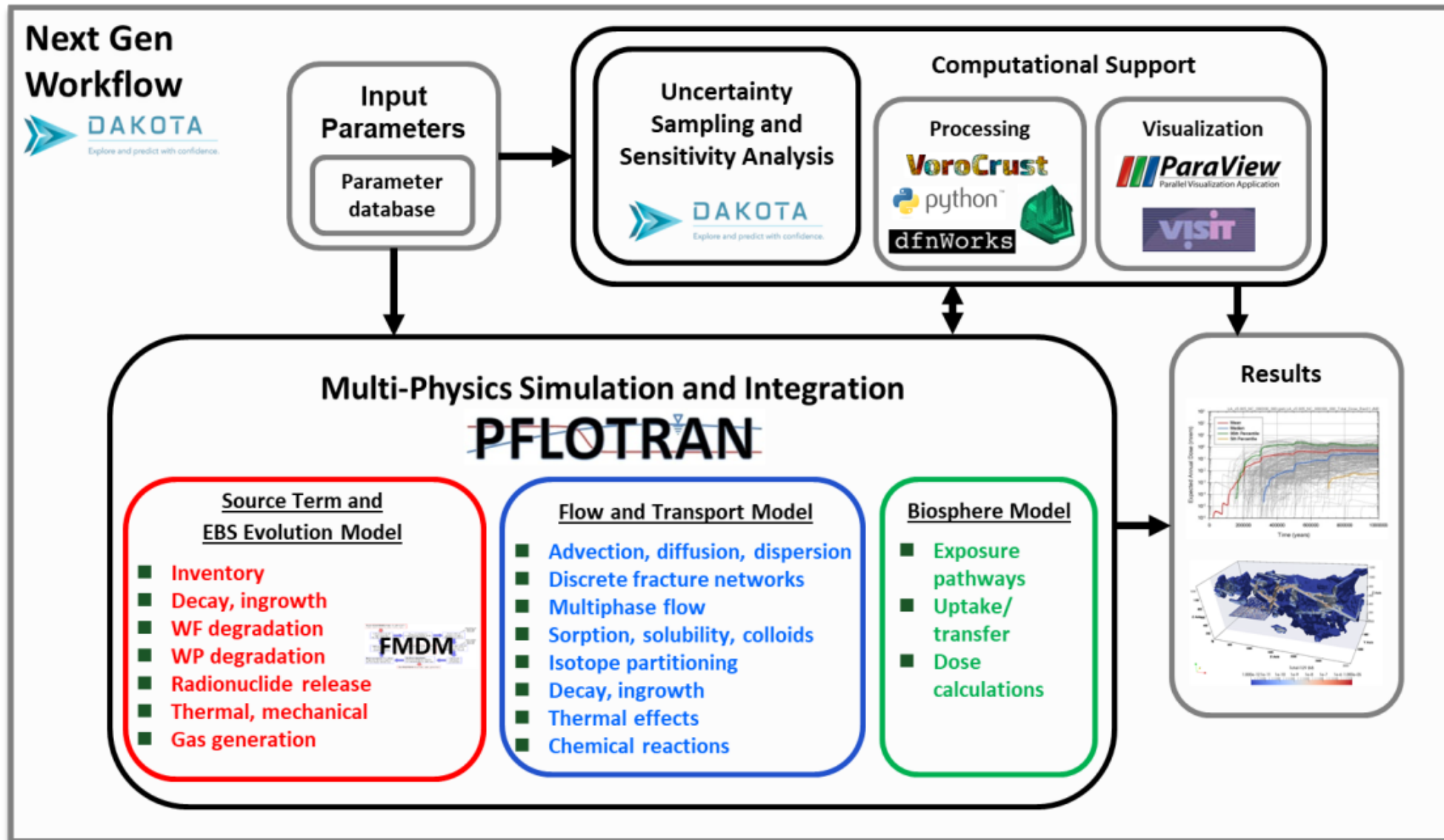
WBS Number	Title	CAM: Emily Stein	FY21: \$6.9M
1.08.01.03.04.01	GDSA - Geologic Modeling - INL		
1.08.01.03.04.02	GDSA - Geologic Modeling - LANL		
1.08.01.03.04.03	GDSA - Modeling and Integration - LANL		
1.08.01.03.04.04	GDSA - Uncertainty and Sensitivity Analysis Methods - SNL		
1.08.01.03.04.05	GDSA - Framework Development - SNL		
1.08.01.03.04.06	GDSA - Repository Systems Analysis - SNL		
1.08.01.03.04.07	GDSA PFLOTRAN Development – SNL		
1.08.01.03.04.08	GDSA - Modeling and Integration - ORNL		
1.08.01.03.04.09	GDSA Modeling and Integration - LBNL		
1.08.01.03.04.10	GDSA - Modeling and Integration - PNNL		
1.08.01.03.04.11	GDSA - FEPs Reevaluation for ABD Glass - SNL		
1.08.01.03.04.12	GDSA - FEPs Reevaluation for ABD Glass - ANL		

Glenn Russell  
Michael Gross  
Jeffrey Hyman  
Laura Swiler  
Paul Mariner  
Tara LaForce  
Michael Nole  
Rose Montgomery  
Liang Zheng  
Mark Nutt  
Laura Price  
Bill Ebert

# GDSA Session – Monday, May 17, 11:00 to 12:30 MT

- 11:00 – GDSA Framework Development, Paul Mariner
- 11:05 – On-Going Efforts to Increase the Efficiency of the FMD Process Model with Fortran, Jacob Harvey
- 11:10 – PFLOTTRAN Development, Michael Nole
- 11:15 – Expansion of Thermal Modeling Capabilities in PFLOTTRAN, Alex Salazar
- 11:20 – Repository Systems Analysis, Tara LaForce
- 11:25 – DECOVALEX Crystalline Case Development, Rosie Leone
- 11:30 – Sensitivity Analysis for the Latest Crystalline Reference Case, Laura Swiler
- 11:40 – dfnWorks: A Discrete Fracture Network Modeling Suite, Jeffrey Hyman
- 11:50 – Development of a PFLOTTRAN Compatible Biosphere Model, Caitlin Condon
- 12:00 – Geologic Modeling of a Generic Alluvial Basin, Michael Gross
- 12:10 – Geologic Modeling – INL, Glenn Russell
- 12:20 – Conceptual Model of Interactions between Shallow Geosphere and Biosphere in Crystalline Rock Environments, Frank Perry

# GDSA Framework



# GDSA Framework Development

- Integration
  - Communication / collaboration
    - DOE, SFWST Disposal Research, international
  - Five-year plan, roadmap, gaps, coupling new models
  - Resources: SFWD Document Archive, external collaborative SharePoint site, GDSA calculation archive
- Development
  - GDSA Framework Next Gen Workflow (user interface)
  - Geologic Framework Model (Perry, later this session)
  - Fuel matrix degradation
    - Surrogate models (Berg, Machine Learning session)
    - Fortran process model (Harvey, later this session)
  - Waste package corrosion
    - Buffer erosion / copper corrosion



Two milestones for FY21



# Future Work (GDSA Framework)

- Continued development of GDSA Framework
  - Implementation of process model surrogates
    - Waste package corrosion, buffer erosion, fuel matrix degradation, dynamic adsorption
  - Code/model integration/coupling
    - Biosphere, dfnWorks
  - Next Gen Workflow
    - Enhanced processing / post-processing options
- Subsystem performance metrics
  - EBS, natural barrier system

