NETL's Science-based AI/ML Institute

Rose, Kelly[1]; Shih, Chung Yan[2]

[1]National Energy Technology Laboratory; [2]Leidos

SAMI is enabling AI-driven solutions and support to applied energy science, addressing the nation's environmental, economic and social challenges.

SAMI 5 key emphasis areas

- Accelerate AI Innovation
- Catalyze Partnerships & Collaborations
- Make Data Accessible
- Inform Governance & Standards
- Advance AI Workforce

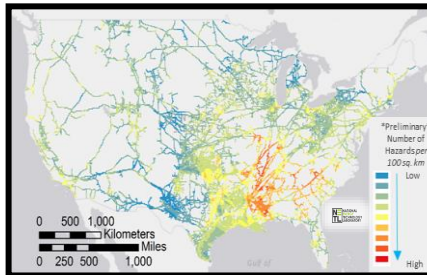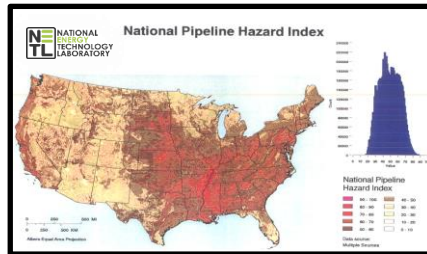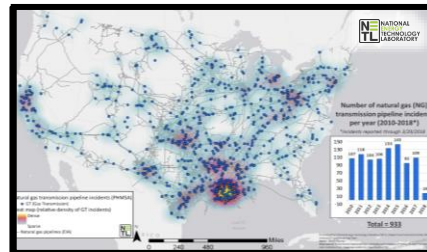NETL established SAMI, a joint Institute for AI and ML, in 2020.

SAMI is a *crosscutting catalyzer of AI- and ML-driven solutions*, to support the acceleration across the NETL R&D mission space.

SAMI addresses fundamental challenges of applying AI/ML: Available data sets, data management, science-AI integration, and governance.

SAMI applies AI/ML capabilities in the applied energy domains, such as **subsurface** (SMART), **material** (eXtremeMAT), **computational science** (MFiX), and **system analysis** (IDAES) with research **data curation, management and virtual computational capabilities** (EDX++).

Geospatial Optimization for Pipeline Sensor Deployment

National Pipeline Hazard Index

Identified priority **areas** for **monitoring**, **maintenance**, and **improvements**

Optimized placement of **advanced sensing & monitoring tools**

AI/ML and geo-data science for risk, resource & resiliency analyses

ML to Forecast Subsurface Storage Leakage & Induced Seismicity Risks

AI to rapidly find & aggregate infrastructure geo for CH4 emissions mitigation and orphan well predictions

Data science & ML to support energy transitions and inform energy, social & environmental justice activities

ML for Pipeline Planning & Hazards Mitigation

Big data & digitalization to support supply chain & manufacturing

Justman, et al. (2022). **A database and framework for carbon ore resources and associated supply chain data.** *Data in Brief.* https://doi.org/10.1016/j.dib.2021.107761

Infrastructure and Sensing R&D includes predicting infrastructure risks, mitigating pipeline hazards, supply chain digitalization, and more.

Learn more about SAMI:

Contact Us: SAMI@netl.doe.gov