the ENERGY lab

R&D FACTS

Geosciences

Geoscience Analysis, Interpretation, and Assessments (GAIA) Computational Facilities

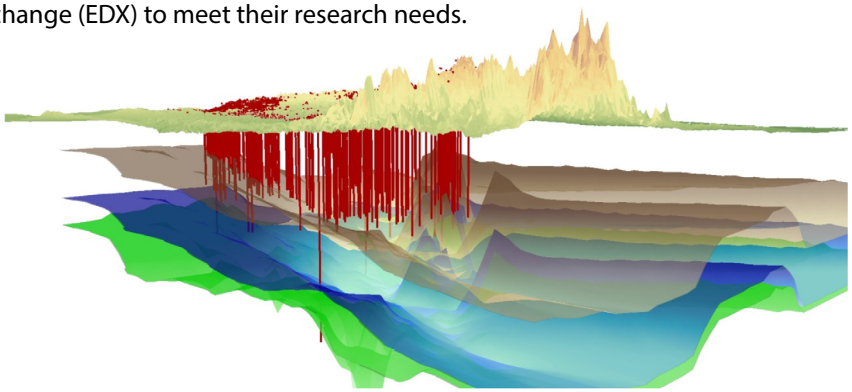
Description

Scientists use the National Energy Technology Laboratory's (NETL) Geoscience Analysis, Interpretation, and Assessments (GAIA) Computational Facilities for a range of computational research needs among the Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania sites. The GAIA facilities provide access to terabytes of geologic and environmental datasets on high performance computers with advanced tools, models, and software. In addition, the desktop and video sharing capabilities within the GAIA facilities support real-time research collaboration and analysis.

Capabilities

The GAIA facilities permit scientists to access, interpret, analyze, visualize, and model data on high performance computers with pre-loaded software, such as ArcGIS, Petra, EarthVision, GoldSim, MATLAB, and other advanced analytical, statistical and modeling packages. These computers are equipped with high-performance Intel processors, graphics cards, and large amounts of RAM. Real-time collaboration among researchers is facilitated through web cams and video/desktop sharing applications, such as Skype, Join.me, and WebEx.

In the GAIA facilities, researchers are able to evaluate and utilize their data, whether generated in the field or from internal laboratories, such as the geomaterial and geoimaging facilities. Additionally, the GAIA facilities enable scientists to access external data, models, and tools, for example, those available through the Energy Data eXchange (EDX) to meet their research needs.



3Dvisualizations of topography and subsurface layers/intervals in the Appalachian Basin can be created using the GAIA facility. These interpretations support geospatial and geostatistical evaluations associated with CO_2 storage assessments, as well as subsurface risk and impact studies associated with hydrocarbon systems and underground injection and storage.

CONTACTS

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NATIONAL ENERGY TECHNOLOGY LABORATORY

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Website: www.netl.doe.gov

Customer Service: 1-800-553-7681

U.S. DEPARTMENT OF ENERGY

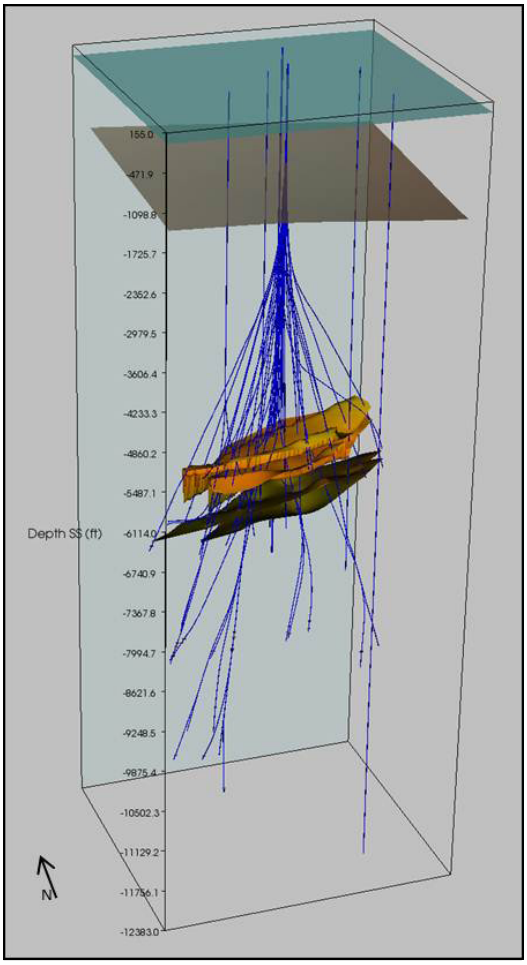
Ongoing research conducted in the GAIA facilities encompasses a wide range of activities. NETL researchers and collaborators are studying engineered-natural systems related to a number of research topics, including assessing risks related to offshore hydro-carbon production and the recovery of unconventional resources, i.e., shale gas, estimating CO_2 storage potential in various types of geologic formations, and conducting computational analyses of wellbore cement and other key borehole materials.

Benefits

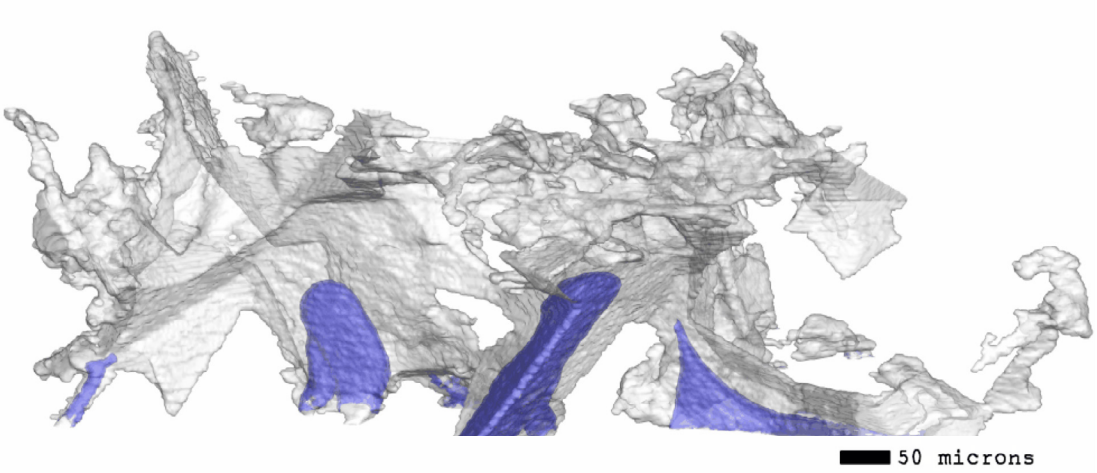
The GAIA facilities provide consistent access to research caliber work stations at all NETL sites to meet geologic and environmental science research and development (R&D) needs for a range of projects and users. GAIA facilities also provide a place for visiting scientists and researchers with NETL information technology (IT) credentials to efficiently work at any NETL site.

The science-based analyses conducted using GAIA facilities inform our understanding of geologic and environmental systems, expose knowledge gaps, and drive further research. The integrated and collaborative setting of the GAIA facilities assists knowledge-sharing across projects and disciplines, thus improving NETL's chances of solving energy issues related to these systems.

Research carried out through the GAIA facilities helps ensure enduring access to domestic energy resources. This research influences the safe and reliable use of our natural resources, development of new energy resources, and protection of the environment.



NETL interpretation generated using GAIA facility resources and 3D visualization of directionally drilled boreholes in the Gulf of Mexico showing two reservoir sand intervals.



The GAIA facility allows researchers to study multiphase computational fluid dynamics such as this example from a μmCT-derived image that shows CO_2 flow in pore space in a Mt. Simon sandstone core.