

3D SUBSURFACE EARTH MODELS

The long-term vision of this center is directed toward research challenges in the development of 3D subsurface geology models for mineral deposits, particularly as these integrate diverse geoscience data types of dissimilar spatial resolution and distribution to minimize geological risk during exploration and across the mining life cycle.



Research will advance geoscience knowledge, analytical capabilities, geostatistical methods, and computational algorithms to analyze and visualize the subsurface. Meeting the global demand for earth resources represents a grand challenge for modern society.



OUR TEAM

COLORADO SCHOOL OF MINES

- Department of Geology and Geological Engineering (10 Faculty)
- Department of Mining Engineering (2 Faculty)
- Department of Applied Mathematics and Statistics (3 Faculty)
- Department of Geophysics (3 Faculty)

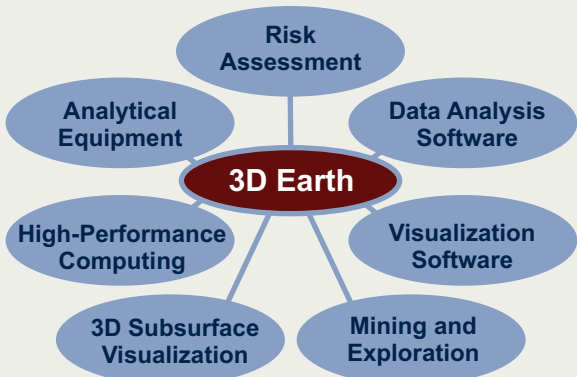
VIRGINIA TECH

- Department of Mathematics (4 Faculty)
- Department of Statistics (1 Faculty)
- Department of Mining and Minerals Engineering (2 Faculty)
- Department of Geosciences (5 Faculty)

INDUSTRY ADVISORS

FURTHER INFORMATION

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I/UCRC for Advanced Subsurface Earth Resource Models

3D Data Integration, Interpretation, Visualization, and Analysis at all Scales



Application of the research results will help exploration and mining companies to minimize drilling and to increase the chances of exploration success.

Our mission is to transform the way geoscience data is used to locate subsurface earth resources. This research center is directed toward research challenges in the development of 3D subsurface models. We will advance geoscience knowledge, analytical capabilities, geostatistical methods, and computational algorithms to model and visualize the subsurface of our Earth.

3D EARTH

The **Colorado School of Mines** and **Virginia Tech** invite participation in a new collaborative research initiative that will focus on the development of 3D subsurface earth models.

The Colorado School of Mines and Virginia Tech bring together **over 250 years of experience** in earth resource research and service to the global exploration and mining industry.

RESEARCH THRUST AREAS

3D MODELING

- Model development and interpretation in three dimensions.

DATA INTEGRATION AND INTERPRETATION

- Diverse data types of dissimilar spatial resolution and distribution.
- Development of novel computational methods for 3D geophysical modeling, inversion, and data analysis to characterize geological targets at deposit and district scales.

VISUALIZATION

- Development of graphical and exploratory data analysis and visualization tools.
- Reducing computational time spent on required for data analysis and visualization.

ANALYSIS

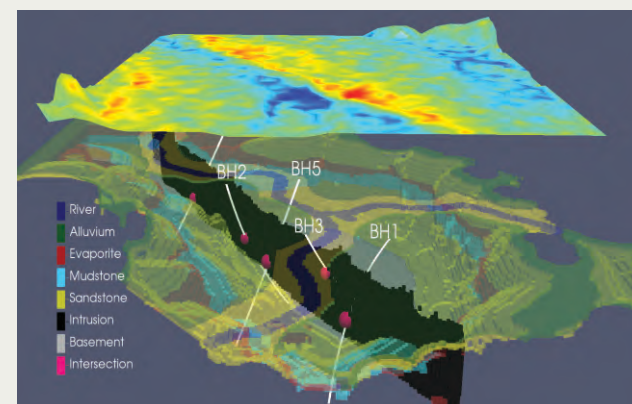
- New instrumentation, analysis, and interpretation methods for characterization of rock properties.

SCALE

- Scaling rock physical and chemical properties and heterogeneities from mineral grain to mine block dimensions.

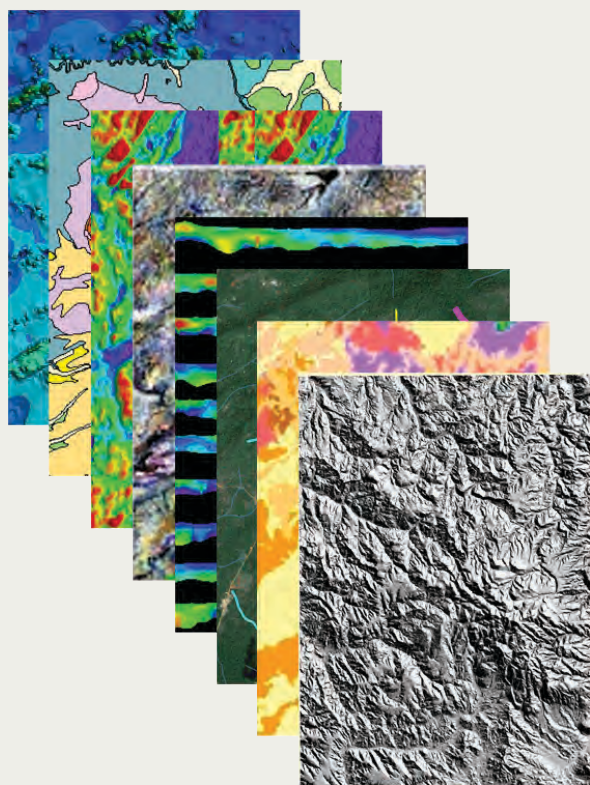
WHO WE ARE

We are a multidisciplinary team of **over 25 researchers** from two institutions with expertise in economic geology, geophysics, spatial statistics, high-performance computing, and mining and minerals engineering.



Our vision is to lead the **digital revolution of the global exploration and mining industry** through the development of new spatial analytical techniques informing decision making during all stages of exploration, from target recognition through feasibility studies to mining.

Founding projects will be developed in cooperation with industry associates and focus on the development of novel approaches to surface and subsurface data acquisition, data integration, visualization, and interpretation at all scales in three dimensions. The projects incorporate diverse geoscience data types of dissimilar spatial resolution and distribution.



**3D Data Integration, Interpretation,
Visualization, and
Analysis at all Scales**