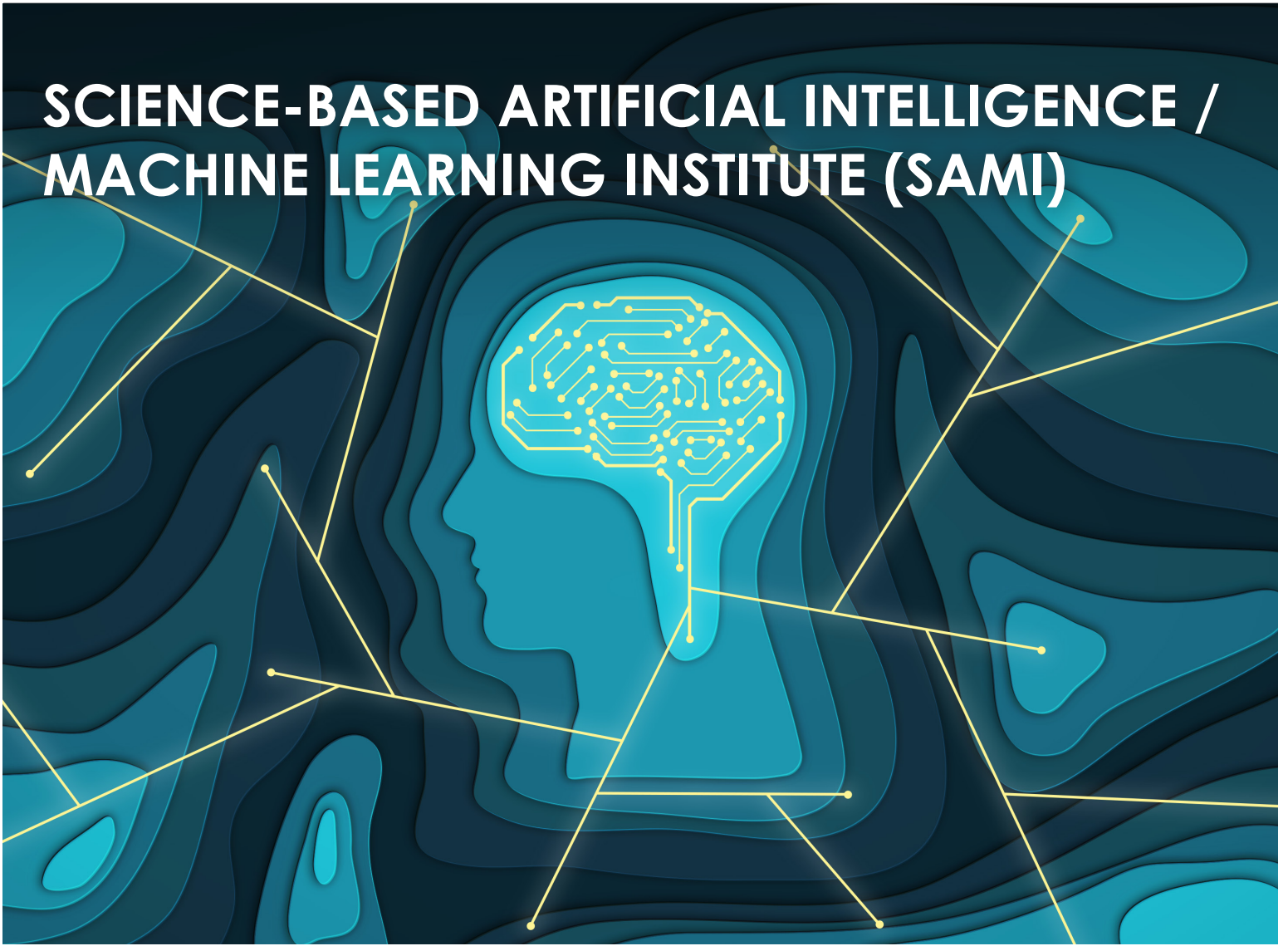# SCIENCE-BASED ARTIFICIAL INTELLIGENCE / MACHINE LEARNING INSTITUTE (SAMI)

NETL
NATIONAL ENERGY TECHNOLOGY LABORATORY

The National Energy Technology Laboratory (NETL) and our strategic partners are leveraging their technical knowledge and capabilities to develop innovative solutions to complex energy, social and environmental challenges with support from the Science-based Artificial Intelligence and Machine Learning Institute (SAMI).

SAMI-affiliated experts are striving to make breakthrough discoveries in three key areas:

SUBSURFACE — SAMI will enable researchers to accurately predict the viability of subsurface formations to store large volumes of carbon dioxide (CO_2) safely and permanently. SAMI supports the Science-informed Machine Learning for Accelerating Real-Time (SMART) Decisions in Subsurface Applications initiative, which is strategically aligned with U.S. Department of Energy (DOE) goals to achieve net-zero carbon emissions in the power sector by 2035 and the broader economy by 2050.

Albany, OR • Anchorage, AK • Morgantown, WV • Pittsburgh, PA • Houston, TX

U.S. DEPARTMENT OF ENERGY | NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

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MATERIALS — SAMI will expedite development of transformational materials to ensure tomorrow's power plants and transmission infrastructure can utilize new power sources such as hydrogen, enhance efficiencies at existing power plants and use waste streams and carbon ore in new manufacturing processes and clean energy systems. SAMI will further develop and deliver data-generated physics-based models to predict material properties and component performance under extreme environments (temperature, atmosphere) and complex loading (cyclical, triaxial).

OFFSHORE — SAMI will leverage AI/ML informed models to prevent hazards in existing operations and identify opportunities for offshore hydrocarbon infrastructure reuse. Through data modeling efforts, SAMI experts are working to inform stakeholders on infrastructure longevity, geohazards such as submarine landslides or subsurface fluid flow events (known as kicks), and improve the ability to predict hurricanes and other environmental and man-made factors that create risk.

Established in 2020, SAMI leverages NETL's world-class talent and research facilities to address energy-related challenges across all research directorates at NETL.

NETL is a U.S. Department of Energy national laboratory that drives innovation and delivers technological solutions for an environmentally sustainable and prosperous energy future. Through its world-class scientists, engineers and research facilities, NETL is ensuring affordable, abundant and reliable energy that drives a robust economy and national security, while developing technologies to manage carbon across the full life cycle, enabling environmental sustainability for all Americans, advancing environmental justice and revitalizing the economies of disadvantaged communities.

Leveraging the power of workforce inclusivity and diversity, highly skilled innovators at NETL's research laboratories in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania conduct a broad range of research activities that support DOE's mission to ensure America's security and prosperity by addressing its energy and environmental challenges through transformative science and technology solutions.

NETL lends its expertise toward achieving a carbon-free power sector by 2035 and a net-zero economy by 2050 while catalyzing economic revitalization, creating good-paying jobs and supporting workers in energy communities, especially hardhit coal, oil and gas, and power plant communities, across the country. One of the most rewarding aspects of NETL's research is that our innovations and our technologies have the potential to improve people's lives in meaningful ways

This fact sheet is currently undergoing major revisions. We anticipate publishing an updated version later this year. For any questions about NETL's SAMI program, please contact NETL Public Affairs at communications-team@netl.doe.gov. Additionally, see points of contact below.

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