

NATIONAL ENERGY TECHNOLOGY LABORATORY ALBANY, OREGON



U.S. DEPARTMENT OF
ENERGY



NATIONAL
ENERGY
TECHNOLOGY
LABORATORY

1450 Queen Ave. SW, Albany OR 97321



NETL

NATIONAL **ENERGY** TECHNOLOGY LABORATORY

Situated on 42 acres, NETL's Albany, Oregon, complex has specialized laboratories and facilities for conducting research to address critical energy, infrastructure, and manufacturing challenges, including NETL's Advanced Alloy Signature Center and Geospatial Analysis, Interpretation and Assessment (GAIA) Computational Facility. Research at the Albany campus focuses on alloy and materials development, critical materials, geoscience, geomaterials science, and artificial intelligence and machine learning, and contribute to NETL's core competencies in Computational Science & Engineering, Materials Engineering & Manufacturing, Geological & Environmental Systems, Energy Conversion Engineering and Strategic Systems Analysis & Engineering. The Albany complex is in close proximity to Oregon State University and the University of Oregon, providing opportunities for extensive research collaboration with scientists in academia.



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Over the years, scientists and engineers working at NETL's Albany site have been awarded numerous patents, and they have substantially contributed to the fields of metals and minerals research. NETL's Albany lab traces its origins to 1943 when President Franklin D. Roosevelt announced that the U.S. Bureau of Mines had selected Albany as the site for the new U.S. Bureau of Mines, Northwest Electro-Development Laboratory. The original mission of the Laboratory was to find methods for using the abundant low-grade resources in the area and to develop new metallurgical processes using the ample electrical energy in the area. Early innovations at the site include the commercialization of the Kroll Process for producing Zirconium and other reactive metals that are critical to the nation's security. These innovations help create the reactive metals industry including several companies that still operate in Albany today.

In 1995, Congress closed the U.S. Bureau of Mines and transferred the Laboratory in Albany to the Department of Energy's Office of Fossil Energy. In late 2005, the Albany Research Center was reorganized to become part of NETL. This action aligned the Albany laboratory's expertise in materials performance and process development with NETL's mission to discover, integrate, and mature technology solutions to enhance the nation's energy foundation and protect the environment for future generations.

The Laboratory has a rich history in energy innovation and is internationally recognized for significant contributions in the areas of materials research. In 1984, ASM International, the world's largest and most established materials information

society, recognized the laboratory for pioneering the process of making ductile zirconium and designated the site an ASM Historic Landmark. More recent contributions include: development of radiopaque alloys for medical coronary stents; enhanced processing methods to improve armor materials for military applications; computational tools for heat treating and homogenization processing of alloys; and development of modified chrome-oxide refractory brick material that extended the service life of slagging gasifiers.

NETL Albany continues to be a leader in developing structural materials for extreme environments. NETL's capability is anchored by its Advanced Alloys Signature Center and substantial alloy fabrication and performance testing facilities used to deliver high-performance, affordable materials that enable diverse energy

technologies and other advanced technologies. Researchers specialize in the design, synthesis, performance evaluation and manufacturing of alloys.

The Advanced Alloys Signature Center is unique national resource for prototyping new alloys. The center retains capabilities for melting, casting, forging, rolling, and heat-treating alloys ranging in size from a few grams to 200 kilograms. This allows for new alloys to be produced using industrially relevant manufacturing methods and at sizes the gap between the laboratory and production scales. The Center also includes the Severe Environment Corrosion Erosion Research Facility and related laboratories for assessing materials performance in simulated service environments.

An expansion of Advanced Alloys Signature Center is currently underway at the Lab in Albany and will synergize the efforts of



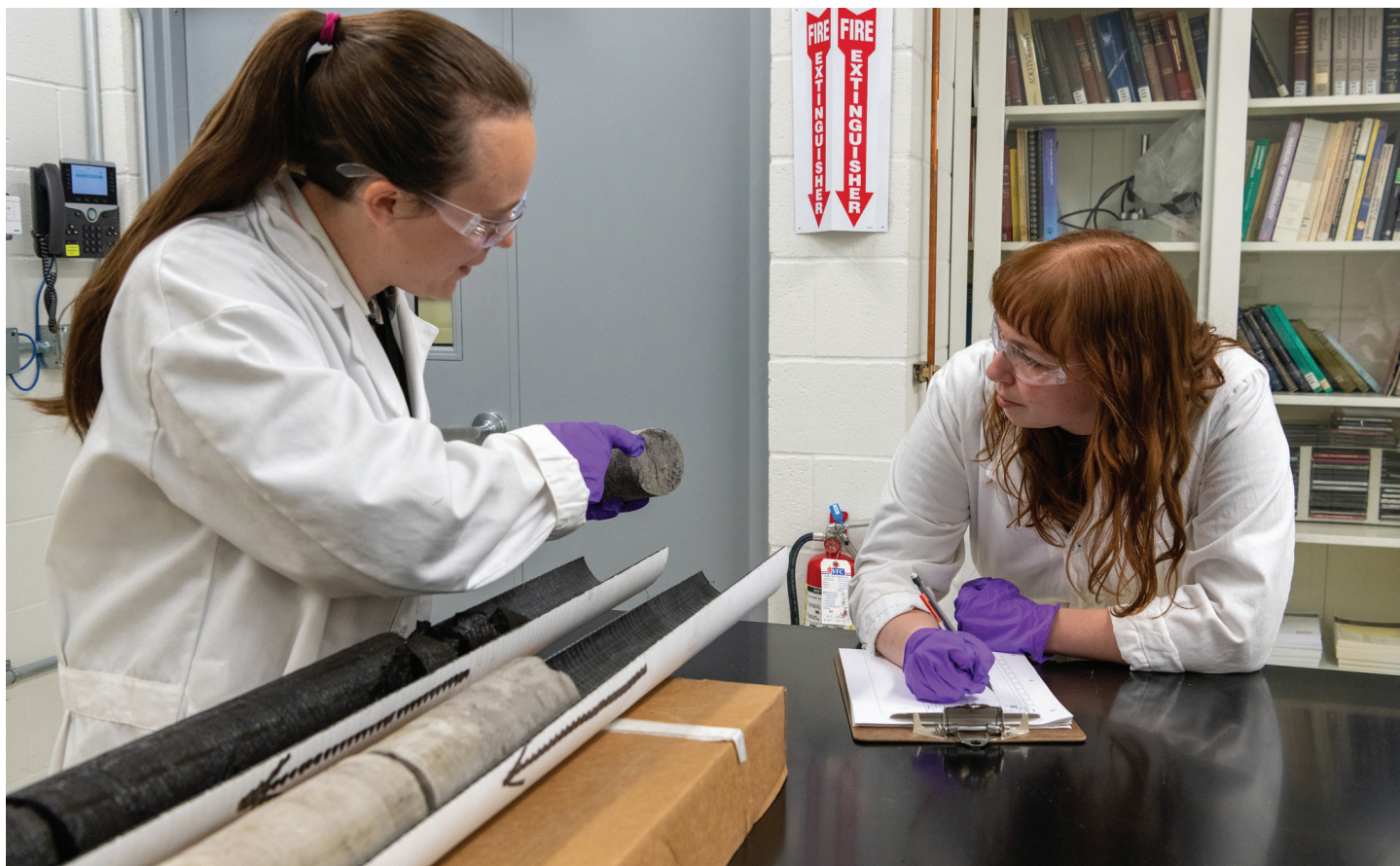
industry, U.S. government agencies (including other national laboratories) and research universities to prototype alloy solutions. This effort will drive the development of next-generation, high-performance materials needed to generate affordable, clean electricity, support growth in emerging U.S. industries and strengthen America's position as a world leader in alloy design and production.

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Over the past decade, NETL Albany has expanded its geoscience and geomaterials science capabilities to better understand and characterize both engineered and natural systems related to fossil energy and carbon management. This includes the multi-functional, state-of-the-art facility High Pressure Immersion and Reactive Transport Laboratory, which is capable of performing geological studies at simulated depths up to 10,000 feet, providing an experimental basis for modeling various subsurface phenomena and processes.

NETL's Geospatial Analysis, Interpretation and Assessment (GAIA) Computational Facility enables connectivity and real-time collaboration among NETL's three research sites to visualize, interpret, analyze, and model geoscience (geology, geophysics, geochemistry) and geospatial data sets. The GAIA facility develops advanced geoprocessing of big data, high-performance computing capabilities. Furthermore, GAIA is the custodian of NETL's first big data computing cluster in support of our geo-data science research and development.



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.

