





Integrating Manufacturing Technologies. Optimizing Solutions.

Oak Ridge National Laboratory (ORNL) works with original equipment manufacturers, material suppliers and end users to revolutionize the way products are designed, built, post-processed and qualified. Research and development in advanced manufacturing enables opportunities for product customization, improved performance, multifunctionality and lower overall manufacturing costs.

The Department of Energy's Manufacturing Demonstration Facility at ORNL facilitates the rapid adoption of advanced manufacturing technologies to enhance US workforce development. The impact of advanced manufacturing is felt across entire supply chains and industrial base sectors including transportation, infrastructure, aerospace, electronics, energy generation and distribution. By leveraging capabilities in materials development, characterization and processing, and world-class facilities for modeling and simulation, high-performance computing, artificial intelligence and data analytics, ORNL is developing next-generation systems and creating a digital factory that will impact energy usage and US competitiveness.



Additive Manufacturing

Creating innovative designs and processed materials that enable better performance in heating or cooling, lightweight materials, efficient and low-cost electronics, and/or improved sustainability.



Machine Tooling

Developing intelligent machine tools to leverage advances in robotics, high-precision automation, specialty materials, precision components and additive, subtractive and hybrid machining.



Roll-to-Roll Processing

Developing processes for thin film electronics that will allow for multifunctional devices to be integrated into additively manufactured components.



Carbon Fiber and Composites

Enabling a broader use for advanced composites such as conversion of textile precursors to potentially reduce carbon fiber cost and increase commercial viability.



Digital Manufacturing

Leading a manufacturing renaissance by working with industry, academia and other agencies to create a digital factory that bridges the gap between systems and software.

Next-Generation Manufacturing: The Digital Framework

ORNL is creating a digital framework suitable for a range of manufacturing technologies while integrating existing processes to provide new, optimized solutions. This approach ensures that critical facilities and intellectual capital are accessible to industry while addressing US manufacturing challenges.

ORNL is advancing next-generation energy-efficient manufacturing methods and systems, using unparalleled capabilities and scientific staff including:

- **Unique Facilities.** ORNL is home to world-leading research facilities and capabilities in manufacturing, carbon fiber, battery research, supercomputing, neutrons, isotopes, and advanced materials.
- **New Manufacturing Systems.** ORNL has a broad range of the latest manufacturing systems to facilitate research activities.
- **Digital Platform.** Simulation, data analytics, visualization, artificial intelligence and machine learning are several of the computational tools being utilized by ORNL to advance manufacturing processes.
- **Robotics, Controls & Automation.** Based on years of research activities in energy and defense fields, ORNL is home to novel robotics, controls and automated systems.



BAAM ™ (Big Area Additive Manufacturing)

Manufacturing Facilities at ORNL



MDF DOE's Manufacturing Demonstration Facility

The MDF engages industry, providing access to R&D expertise, focusing on composites, additive manufacturing, hybrid manufacturing, digital manufacturing, and machine tooling, working with more than 45 advanced manufacturing systems.



CFTF DOE's Carbon Fiber Technology Facility

The CFTF offers a highly flexible, instrumented production line for demonstrating advanced technology scalability with applications for vehicles, wind, infrastructure, and compressed gas storage.



BMF Battery Manufacturing Facility

The BMF develops low-cost manufacturing materials and methods for roll-to-roll processing, supporting a domestic supply chain for advanced batteries.

Working with ORNL

ORNL provides industry with access to unique research facilities and reduces industry risk for adopting cutting-edge manufacturing technologies. The laboratory has decades of experience working with industry through a variety of business agreements and recognizes the importance of protecting intellectual property. Critical advanced manufacturing technologies developed at ORNL will provide the basis for high-quality jobs for the nation and increase US manufacturing competitiveness.

For more information on how to work with ORNL, visit www.ornl.gov/partnerships.



Binder jetting with powder particles



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