Manufacturing Demonstration Facility

A National Resource for Industry

OAK RIDGE National Laboratory

Revitalizing US Manufacturing

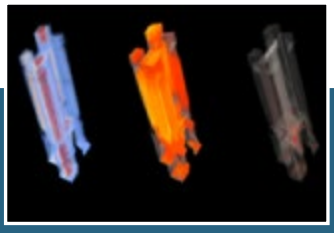
The Manufacturing Demonstration Facility (MDF) at Oak Ridge National Laboratory (ORNL) is the Department of Energy's (DOE) first national user and research facility established to provide industry with affordable and convenient access to infrastructure, tools and expertise that facilitate rapid adoption of advanced manufacturing technologies to enhance US workforce competitiveness. Designed to reduce technical risk and support the business case for private investment in new production technologies, the MDF integrates foundational science expertise with a growing industrial and academic network that inspires collaborations, thought leadership and successful execution of complex projects.

Inspiring Industry

ORNL works with more than 100 companies yearly for technology advancement and commercialization. More than 20 startups have been formed based on ORNL-developed technologies over the past five years. Under the MDF Technology Collaborations Program, industry can leverage world-leading capabilities and expertise in short-term collaborative projects approved by DOE. For more information on how to work with ORNL, visit www.ornl.gov/partnerships.

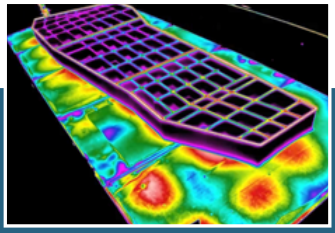
Materials

Developing metallic alloys and polymers designed for additive manufacturing, creating hybrid materials, and understanding the role of feedstocks.



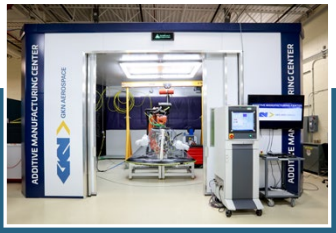
Software

Integrating in situ monitoring, machine learning, and data analysis and deploying rapid qualification tools.



Metrology

Implementing physics-based simulations, 3D tomography, in situ nondestructive evaluation and post-processing metrology techniques.



Systems

Developing pick and place hybrid systems, and optimizing andvanced materials.

Additive Manufacturing

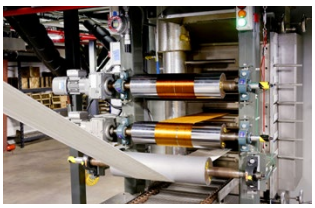
Additive manufacturing (AM) is the ability to deposit materials layer by layer to fabricate complex components directly from computer-aided design models. The MDF is leveraging ORNL's science capabilities to solve challenges in AM by improving performance characteristics of AM components, optimizing systems and software to achieve mainstream manufacturing, developing qualification frameworks to create born-certified components and developing a comprehensive understanding of process capabilities and limitations through physics-based simulation and advanced characterization.

Machine Tooling

Intelligent machine tools leverage advances in robotics, automation and specialty materials. Advanced machining capabilities combine additive and subtractive features, creating hybrid systems with precision components.

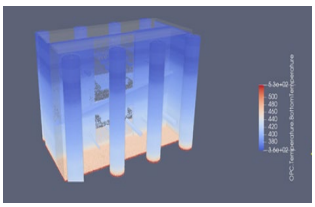
Roll-to-Roll Processing

DOE's Battery Manufacturing Facility (BMF) at ORNL is the country's largest open-access battery R&D facility. The BMF performs pilot-scale research to make batteries more economical, safer and more efficient to meet mass market needs. Research includes roll-to-roll processing techniques for the manufacture of flexible electronics, photovoltaics and energy storage systems.



Carbon Fiber and Composites

ORNL's Carbon Fiber Technology Facility (CFTF) demonstrates the scalability of producing low-cost carbon fiber. Leveraging CFTF capabilities has led to additional research on microstructure and properties of discontinuous fiber composites, structural modeling of composites in various environments and properties of advanced multiphase materials.



Digital Manufacturing

As industry transitions to late-stage research and product development, manufacturing is focusing on machining, composites, additive manufacturing, artificial intelligence, robotics, controls and automation. The MDF is seamlessly integrating various technologies into a digital framework to ensure facilities and intellectual capital are accessible to address challenges and adapt to emerging industry needs.

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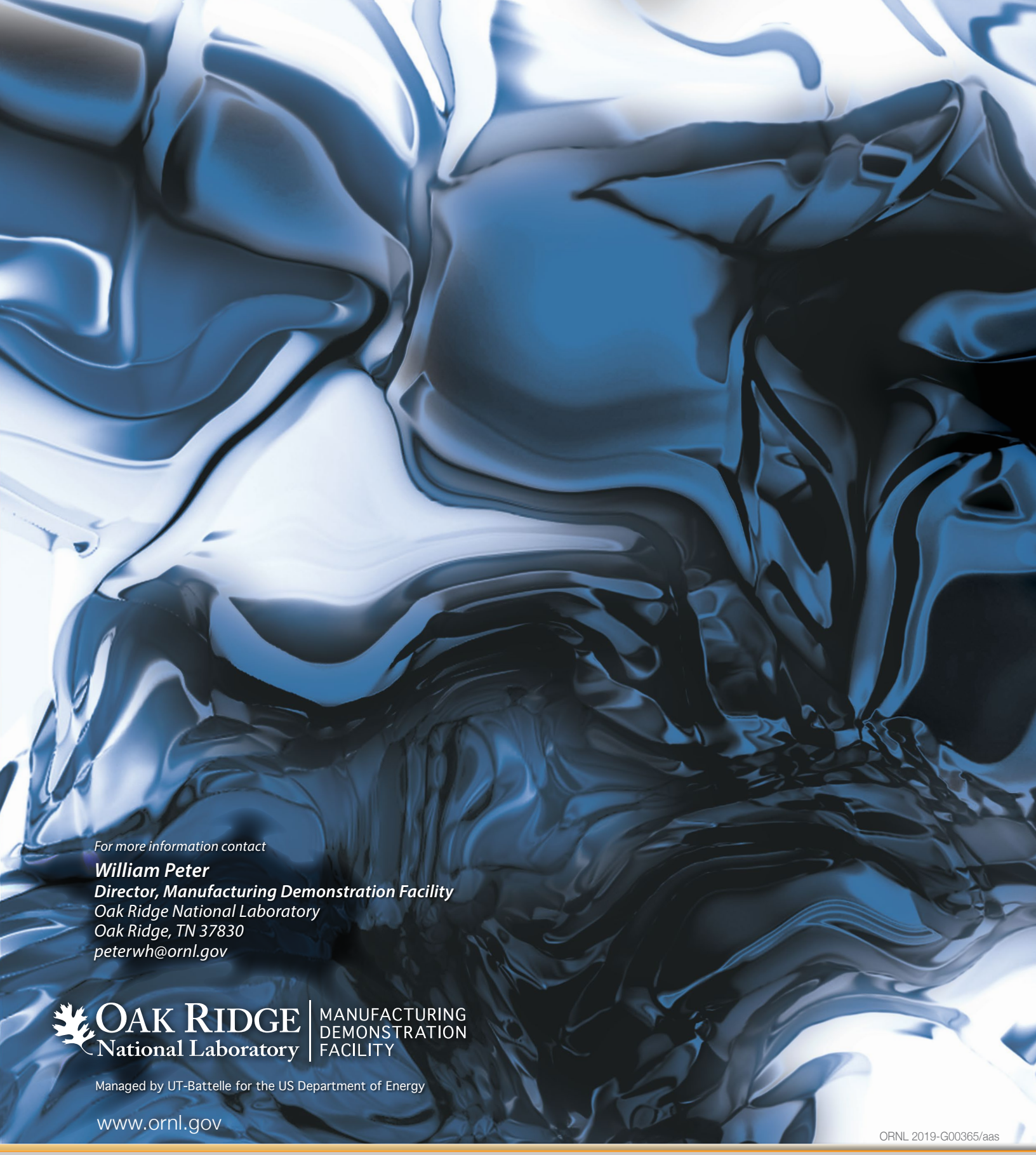
Additively manufactured turbine blades



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OAK RIDGE National Laboratory | MANUFACTURING DEMONSTRATION FACILITY

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