# Dossier: MATERIALS RESEARCH & DESIGN INC

## SBIR Award Details

**Award Title:** N/A

**Amount:** $149,865.04

**Award Date:** 2024-08-05

**Branch:** MDA

## AI-Generated Intelligence Summary

**Company Overview:**

Materials Research & Design, Inc. (MR&D) is an engineering and technology firm specializing in the development and application of advanced computational methods for materials design and structural analysis. Their primary business revolves around providing software, consulting, and research services to industries requiring high-performance materials and structures, particularly in aerospace, defense, and energy. MR&D's core mission is to accelerate the discovery and deployment of novel materials and designs through the application of multiscale modeling and simulation techniques. They aim to solve critical engineering challenges related to material performance under extreme conditions, structural integrity, and weight reduction. Their unique value proposition lies in their integrated approach combining state-of-the-art computational tools with deep expertise in materials science and structural mechanics, enabling clients to optimize material selection, predict performance, and reduce development cycles.

**Technology Focus:**

* SwiftComp Software:\*\* A general-purpose multiscale constitutive modeling platform that links micro- and macro- scales for heterogeneous materials and structures. It allows for efficient homogenization, stress recovery, and progressive damage analysis. SwiftComp can reduce computational time by orders of magnitude compared to traditional finite element analysis, especially for composites.
* Multiscale Modeling & Simulation Services:\*\* MR&D provides custom modeling and simulation services using their in-house expertise and software tools. This includes material characterization, structural analysis, and design optimization for complex systems under a variety of loading conditions, temperature variations, and environmental exposures. Specific applications include predicting the behavior of composite aircraft structures, analyzing the performance of wind turbine blades, and optimizing the design of lightweight armor systems.

**Recent Developments & Traction:**

* SBIR/STTR Grants:\*\* MR&D has consistently received Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grants from various government agencies, including the Department of Defense (DoD) and NASA, for research and development in areas such as advanced composite materials, hypersonic vehicle structures, and additive manufacturing. (Multiple grants over the last 2-3 years)
* Software Updates & Partnerships:\*\* MR&D continues to improve and expand the capabilities of SwiftComp. Recent updates include enhanced support for non-linear material models and improved integration with commercial finite element analysis software packages. They have also formed strategic partnerships with companies in the aerospace and defense sectors to apply SwiftComp to real-world engineering problems.
* Development in Reduced Order Modeling:\*\* MR&D is developing new methods for reduced order modeling to enable real-time simulations that would usually be computationally expensive.

**Leadership & Team:**

* Dr. Wenbin Yu (President):\*\* A leading expert in multiscale modeling and simulation, with extensive experience in the development and application of computational methods for composite materials and structures. Holds several patents and has published numerous journal articles in the field.
* Dr. Zhan Wang (Chief Technology Officer):\*\* Expertise in computational mechanics, finite element analysis, and material modeling. Works on many government-sponsored projects for the U.S. Army, Navy, and Air Force.

**Competitive Landscape:**

* Altair Engineering:\*\* Offers a suite of simulation and optimization tools, including HyperWorks, that compete with SwiftComp in the areas of finite element analysis and material modeling. MR&D differentiates itself through its specialized focus on multiscale modeling and its ability to link micro- and macro- scale behaviors, particularly for composite materials.
* ANSYS, Inc.:\*\* A major provider of engineering simulation software, including tools for structural analysis and computational fluid dynamics. MR&D's SwiftComp offers a faster homogenization and progressive damage analysis than ANSYS for complex materials.

**Sources:**

* [https://www.mresearchdesign.com/](https://www.mresearchdesign.com/)
* [https://www.grants.gov/](https://www.grants.gov/) (Search "Materials Research & Design Inc" for SBIR/STTR awards)
* [https://www.mresearchdesign.com/news/](https://www.mresearchdesign.com/news/) (For announcements)