

April 23rd, 2024

Dear California's Professional Engineers,

I am honored to have received the 2024 Professional Engineers of California Government James E. Roberts Award for my science project at the 74th Annual Los Angeles County Science and Engineering Fair. The discussions held during the award ceremony with California's engineers were eye-opening and have inspired me to continue my research in developing novel materials. I am proud to be a recipient of this prestigious award.

In this study, we introduce "NanoMax," a groundbreaking nanostructured material designed to surpass traditional high-performance materials like carbon fiber and Kevlar. Leveraging the foundational work of Dr. Julia Greer on nano-architected materials and Dr. With Andrei Faraon's advancements in nano-optics, we aim to dramatically refine the size and enhance the properties of 3D printed materials.

Our research focuses on evaluating NanoMax's performance in strength, weight, and energy absorption, assessing its potential to revolutionize sectors such as safety, protection, and sports. Utilizing advanced nanostructuring techniques, we synthesized NanoMax and conducted comparative analyses against traditional materials. Through rigorous mechanical testing, we sought to validate the hypothesis that NanoMax could offer superior properties, potentially redefining material science applications.

Our methodology, inspired by Greer's and Faraon's work, involved precise patterning of substrates using Laser Interference Lithography (LIL), a scalable and efficient method for producing highly precise nano-scale patterns. This facilitated not only the creation of NanoMax but also ensured its structural integrity and optimized properties.

Our findings indicate significant advancements in nano-fabrication, presenting a new paradigm for materials with enhanced performance. This research challenges the current material paradigm, heralding a new era of sustainable, efficient, and versatile materials. NanoMax, with its superior properties, exemplifies the potential to revolutionize industries and address critical environmental concerns, laying the groundwork for future innovations in material science.

Thank you so much for your recognition. This award has motivated me to continue exploring innovative methods to improve material science and its applications across all fields of manufacturing and construction engineering.

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