The Challenge: Current crop yields are insufficient to feed the world’s growing population. Agricultural productivity cannot keep up with the projected needs and a global food crisis is looming. Effective and efficient crop protection is vital. The toxic and expensive pest control solutions currently available are inadequate. It is estimated that billions of dollars in crop protection applications each year protect just 63 percent of crops, leaving farmers with 37 percent of their yield damaged, unmarketable and inedible. Toxic pesticide products may also pose long-term risks including degradation of natural resources due to runoff, leaching and spills.

The Solution: Alexander is committed to addressing global food security challenges through his novel approach to delivering antimicrobial and antifungal pest control agents. Alexander has co-developed lignin-based Environmentally-benign Nano Particles (EbNPs), which could be the basis for Reduced Risk Conventional Pesticide Products, to make pest control delivery more effective while reducing cost and minimizing environmental impact. These biodegradable EbNPs could (i) temporarily enhance the activity of commonly used active ingredients, (ii) improve their drying/spreading properties and (iii) enable them to adhere to parts of the plant to reduce runoff – potentially increasing the efficacy of common pesticides tenfold. EbNP-based Reduced Risk Conventional Pesticide Products could reduce the amount of chemicals used in plant protection by as much as 90 percent and save farmers more than 25 percent on pest control initiatives. Alexander’s EbNPs have the potential to help farmers increase crop yield sustainably and responsibly.

Application and Commercialization: BENANOVA focuses on two synergistic product development strategies: (i) product co-development with large corporate partners for applications with high market entry barriers, and (ii) product development, production, and sales on its own in niche markets with low cost of entry. BENANOVA’s initial target market in the agro chemical industry for its antimicrobial/antifungal crop-protection product is estimated at $10 billion. Alexander seeks to partner with corporate partners to co-develop, manufacture and sell the EbNP-based Reduced Risk Conventional Pesticide Product. He believes that sustainable products with advanced functionality will result in lasting benefits to consumers, society and the environment.