Alan Mantooth, PhD

Pioneering Electronics for a Sustainable Future

Dr. Alan Mantooth leads an internationally recognized, award-winning electronics research program at the University of Arkansas (UA). Dr. Mantooth's work advances semiconductor technology to drive energy efficiency and innovation across various applications - often in extreme conditions, such as on the International Space Station.

His team creates electronics that can withstand high temperatures, such as those found in deep well drilling and vehicle engine compartments. Dr. Mantooth's work has contributed over $5 billion to the U.S. economy through his three successful startup companies, his own contributions while in industry, and technologies transferred from the UA.

MUSiC - Transforming Silicon Carbide Research

Dr. Mantooth's latest achievement is the Multi-User Silicon Carbide Research and Fabrication Facility (MUSiC) at the University of Arkansas. This cutting-edge semiconductor research hub produces microelectronic chips made from silicon carbide, a semiconductor with properties that make it superior to traditional silicon in applications involving higher temperatures or higher voltages.

There is currently a lack of accessible facilities like MUSiC specializing in silicon carbide. This scarcity hinders collaboration between universities, businesses, and national laboratories, preventing the rapid development and testing of innovative microelectronic chips essential for keeping up with technological advancements in various industries such as automotive. MUSiC fills a crucial gap by offering a unique prototyping capability in the U.S., fostering collaboration between universities, businesses, and national laboratories.

MUSiC
MULTI-USER SILICON CARBIDE
Semiconductor Research and Fabrication Facility

Training at the facility will help create the next generation of semiconductor engineers and technicians. This is a vital step in bringing semiconductor manufacturing back to the U.S. after it was moved overseas in the late 1990s and early 2000s.

Challenge: Improving Energy Efficiency for a Sustainable Future

Energy inefficiency is a massive challenge of the 21st century: two-thirds of energy is lost before reaching its intended use. We see the effect of this in higher energy bills for households, increased operational costs for businesses, and higher greenhouse gas emissions in the environment. Dr. Mantooth's mission is to maximize resource efficiency and make the most of our precious electricity. His approach is to leverage semiconductor technology in combination with other forms of energy to drive more efficient energy usage. This includes designing electronics that can operate in high-temperature environments, such as vehicles.

Arkansas Research Alliance

The Solution: Driving Efficiency through Semiconductor Technology

Dr. Mantooth's vision hinges on utilizing semiconductor technology to use energy more efficiently, from motors to equipment monitoring. By developing silicon carbide electronics at the MUSiC facility, he enables electronics to function in extreme conditions, revolutionizing industries like automotive. This approach makes the impossible possible - integrating new materials into power management, control, and monitoring and ushering in an era of efficient energy distribution and usage.

Next Milestones and Ask: Supporting Growth and Innovation

Dr. Mantooth's team is expanding. It currently comprises 17 faculty members with a growing number of graduate students, the driving force behind the innovation. To support this growth and foster collaboration with industry giants like Ford, Toyota, and John Deere, additional infrastructure is needed. This includes office and lab space, resources to capture ongoing innovation and room for future expansion.

Dr. Mantooth's significant endeavors rely on securing the necessary resources to sustain his mission of catalyzing groundbreaking advancements in electronics and energy efficiency. The funding requisites include:

1. Supporting student achievement through initiatives like scholarship funds.
2. Ensuring competitive staff salaries.
3. Expanding office space, costing up to $40 million.
4. Enhancing the MUSiC facility to accommodate further research and broaden its technological applications, with an investment of up to $45 million.
5. Providing financial backing to establish a 501c3 non-profit entity (up to $5 million), which will function as the intermediary connecting MUSiC with its extensive user base.

Dr. Alan Mantooth's research is not just about advancing technology; it is about forging a sustainable and efficient future for all. His innovative approach and achievements merit your support to move our society toward a more energy-efficient future.

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