The Department of Chemical Engineering Presents:

Kwang-Yu and Lee-Chien Wang Fellowship Lectures

The Future of Aerospace Materials: Challenges & Opportunities

R I C H A R D V A I A

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https://rochester.zoom.us/j/98875611576?pwd=RHY3bmhrRFZEMGhiUW5wZ0VIaDNuUT09

Abstract: Over a hundred years ago, the pioneers of aviation took flight in no small part due to material innovations ranging from novel casting of aluminum engine blocks to judicious selection of natural materials. Unquestionably, the future of aerospace will look as different from today as the Wright Flyer and Curtiss June Bug differ from UAVs and F35s. However, the role of materials will remain unchanged – they will be the crucial ingredient that enables these future machines to push the performance envelope. The Air Force Research Laboratory is pioneering the development of tools necessary to hasten the discovery and deployment of these vital materials. Crucial to this success is a shift from “what” to “how” via embracing technologies of the digital revolution to accelerate development, reduce qualification cost, and provide agile manufacturing methods.

An example of in-house research will be highlighted, focusing on establishing large-scale production and functionalization capacity of Noble Metal and Layered Transition Metal Dichalcogenides Nano-Particles through a fundamental understanding the growth and exfoliation mechanisms. This underlying insight simultaneously increases production concentration, while reducing structural dispersity, impurities, and reagent waste. Increased availability with greater tunability at lower cost expands evaluation of these unique nanomaterial families for numerous bulk polymer technologies, such as thermal/optical coatings, structural nanocomposites, and inks for flexible electronics

Bio: Dr. Richard A. Vaia is the Chief Scientist for Materials and Manufacturing at the Air Force Research Laboratory (AFRL). Rich has published more than 250 articles on nanomaterials, with honors including the NAE Membership, AF McLucas Award for Basic Research, ACS Doolittle Award, Air Force Outstanding Scientist, Air Force Office of Scientific Research Star Teams, DARPA Service Chief Fellow, and Fellow of the Materials Research Society, American Physical Society, American Chemical Society, NextFlex, and the Air Force Research Laboratory.