ATLAS
ARC TRAINING CENTRE
LIGHTWEIGHT AUTOMOTIVE STRUCTURES

SPECIAL SEMINAR

PROFESSOR JOSEPH H. KOO

The University of Texas at Austin

ABSTRACT

Polymers/Polymer Nano-composites for Additive Manufacturing

A revolution is occurring in the manner that parts are made. It started with techniques and machines providing a means to rapidly build prototypes of hardware in various polymers for marketing, etc. However, new techniques have quickly progressed in the manufacturing of parts used in aerospace flight vehicles, such as rocket engines. These are no longer toys or desktop displays that are being made. Almost every week, it is reported that additional parts critical to flight are now being manufactured by techniques labeled 3D printing or additive manufacturing (AM). Furthermore, the materials used in these techniques are quickly expanding. The geometries are becoming more complex and the addition of fibers and powders into the matrix are being attempted. In this seminar, an overview of additive manufacturing techniques, such as selective laser sintering (SLS), fused deposition modeling (FDM), and HP Multi Jet Fusion 3D printer (MJF) will be presented. The similarities and differences of these three AM techniques are compared. R&D of different polymer nanocomposites that can be used by these three AM techniques are undergoing study at UT & KAI. Material properties of these AM polymers are characterized.

Date:	Wednesday August 8, 2018
Time:	3.00 - 4.30pm
Location:	AMP Building 55, RMIT City Campus

RMIT UNIVERSITY

About the Speaker

Dr. Koo has over 40 years of industrial and academic experience in program and engineering management. Currently, he is Sr. Research Scientist/Research Professor/Director of Polymer Nanocomposites Technology Lab in the Dept. of Mechanical Engineering at The University of Texas at Austin, Austin, TX. Dr. Koo is the founder of KAI, LLC and currently serves as Vice President and CTO. He is a SAMPE Fellow and Chairman of the SAMPE Nanotechnology Committee. Dr. Koo is an Associate Fellow of AIAA and Past-Chair of the AIAA Materials Technical Committee. He has an excellent track record for developing well-funded research programs sponsored by DOD (AFOSR, AFRL, AMRDEC, DTRA, MDA, NAVAIR, NAVSEA, NSWC, and ONR), DOE, DOT, EPA, FAA, NASA, and private companies. His research group specializes in *"Polymer Nanocomposites Technology Designed for Extreme Environments"* for four major research areas:

- Ablation Research
- Flame Retardant Polymers
- Additive Manufacturing Polymers
- Conductive Polymers and Composites

Dr. Koo's publications include two books, *Polymer Nanocomposites: Processing, Characterization, and Applications,* McGraw-Hill, New York (2006), and *Fundamentals, Properties, and Applications of Polymer Nanocomposites*, Cambridge University Press, Cambridge, UK (2016), and over 550 papers/presentations in materials, thermal, and optical science disciplines. Two new books are forthcoming: *Ablation Science and Technology: Processing, Characterization, and Applications*, Cambridge University Press, Cambridge, UK (2019) and *Polymer Nanocomposites: Processing, Characterization and Applications,* 2nd Ed., McGraw-Hill, New York (2018).

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