

## Abstract

Materials Science and Engineering is of great importance; materials are what we use to support our daily lives and achievements. Incredible performance has been achieved with materials including advanced composites, semiconductors, materials for medical prosthetics and superconductors which have transformed daily lives and human capability. However, currently we are on target to leave our planet much worse than it was when we as individuals came to it. Some have described the current era as the Anthropocene, relating to the impact humans have had on the planet and highlighting that all is not well for humankind and other species living on Earth. How we are using materials and how they are “flowing” through society is a huge problem; the current “take-make-use-waste” models of materials flows has to change to prevent irreversible damage. Effectively, we are stealing from future generations.

We are currently leaving things very late to act sufficiently to rein in the damage being inflicted on the environment. Advances, including those in materials are now needed to enable the required transition to a more “circular” flow. This talk will focus on transdisciplinary research incorporating the concept of a “circular economy/society” and materials targeted to support well-being and a transition to a fairer world. It will have particular focus on developments in renewable and recyclable natural fiber composites for structural and packaging applications including the potential for responsive/4D products. Examples range from basic formaldehyde-free recyclable board products for flooring/walling/furniture and structural materials from recycled CCA timber “disarmed” in terms of toxicity, to controllable 4-D shutters that respond to environmental conditions for improved room comfort and design for disassembly/adaptability structural building panels.

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