4WRD Labs
Innovation Thesis

BIOMATERIAL

'Biomaterial' is a term used to indicate materials that have non-specific biological association.

Examples of biomaterials could be any of the materials listed in this table.

BIOBASED

Biobased materials are 'wholly or partly derived from biomass, such as plants, trees or animals
(the biomass can have undergone physical, chemical or biological treatment)'*. (excluding those derived from fossil sources)

*Examples of biobased materials would include, but are not limited to: natural fibers (e.g. cotton, wool and silk), manmade cellulosics (e.g. viscose),
natural polymers (e.g. chitin, keratin and casein), animal leathers and their alternatives, through to polycotton blends (where the biocontent meets the minimum stipulated requirement).*

BIOFABRICATED MATERIALS

Biofabricated materials are produced by living cells (e.g. mammalian)
and microorganisms such as bacteria, yeast and mycelium.

*Examples of biofabricated materials would include fermented
biosynthetic & biofabricated ingredients and bioassembled materials as below.*

BIOSYNTHETIC

Biosynthetics are synthetic polymer materials comprised, in whole or in part, of bio-derived compounds. These compounds can either be made with an *input* of biological origin (biomass), and/or where the *process* is performed by a living microorganism.

Examples of biosynthetics would include the fermentation (of sugars, GHGs etc.) or the catalytic conversion of biomass to create precursor chemicals for synthetic polymers such as nylons, polyesters and polyurethanes.

BIOFABRICATED INGREDIENTS

Biofabricated ingredients are building blocks produced by living cells and microorganisms e.g. complex proteins like silk or collagen. They need further mechanical or chemical processing in order to make a macroscale material structure.

Examples would include fermented recombinant silk which then has to be spun into a fiber, or processed to form a sheet material.

BIOASSEMBLED

A bioassembled material is a macroscale structure that has been grown directly by living microorganisms such as mycelium or bacteria.

Examples would include mycelium or microbial cellulose leather alternatives.