This seminar provides an overview of the research done in the UQ Composites group using examples of current and recent projects to illustrate research themes and highlight capabilities. The three areas covered are: a) manufacturing including joining of dissimilar materials; b) bio-composites including bio-refinement; and c) sustainment including structural health management and damage simulation.

The first example explores fundamental processes for welding fibre-reinforced composite materials, which includes incorporating a thin layer of weldable material during the manufacturing process. The patented ‘Thermoset Composite Welding’ technique has the potential to significantly reduce the assembly time for structures made from composite materials.

The second example introduces the concept of ‘Augmented Finite Element’ simulation, which enables the simulation of damage initiation and evolution. The technique has been applied to investigate the life-time of aircraft coatings.

The third example illustrates the application of guided wave ultrasonic techniques to locate and characterise laminar damage. The two methods discussed in some detail are guided wave beam forming and diffraction tomography. In this context new concepts are discussed to improve the durability of SHM transducers.