

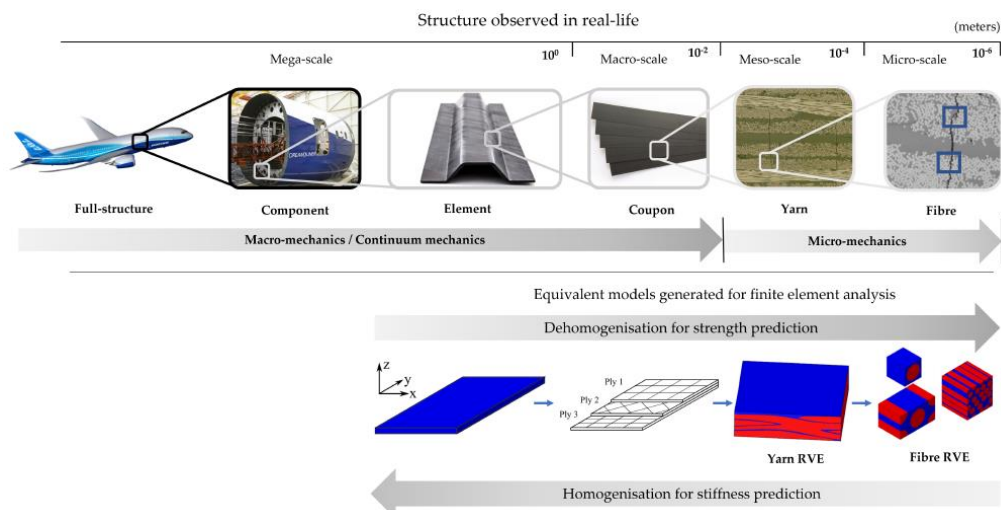


PhD Project Proposal - UNSW/Boeing – Multiscale Modelling - Sept 2022

Composite materials are increasingly used in applications which push their performance to the limit, leveraging their inherent benefits in weight, strength, cost and producibility. Predicting failure (strength) of composite materials is a critical research topic (in both academia and industry) to maximise their engineering potential.

At Boeing, one of the largest aerospace companies in the world; understanding failure in composite materials means understanding how to design, manufacture and deliver the best aircraft to its customers. This is not a trivial problem, as composite materials have many unique failure mechanisms not present in monolithic materials.

In this PhD project you will use an advanced multi-scale modelling approach developed by Boeing and UNSW over the last decade. You will grow the existing body of knowledge on multiscale modelling and dehomogenising the composite into its constituent fibre and matrix components. You will develop state-of-the-art relationships between composite microstructure and structural performance of these advanced materials.

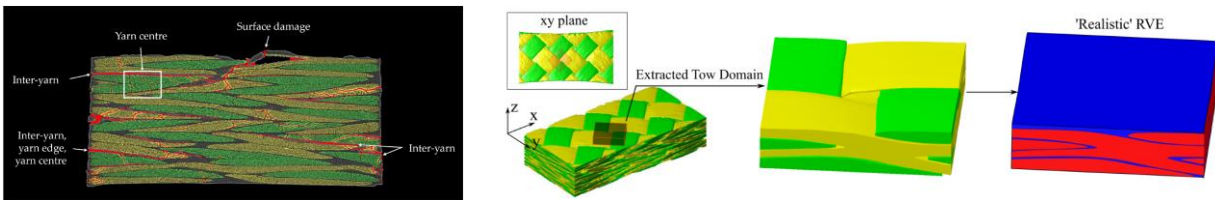


Skills and capabilities:

- Advanced finite element simulation techniques for composite materials
- Composite material fabrication and testing
- Material analytics using microCT

Expected outcomes from this body of work include:

- Using and building on the ONSET theory/framework developed between Boeing and UNSW
- Applying modelling approaches to determine key behavior in failure initiation in composite textiles using statistical and stochastic information of real fabric architectures
- Investigating the micro- and meso-structures of composite materials using microCT and tracking the progression of failure in-situ
- Implementing these modelling approaches to correlate failure predictions to aerospace structures



An ideal candidate for this project will:

- Be seeking a future in the design of lightweight materials and aerospace structures
- Have a Bachelor or Masters Degree in Aerospace, Mechanical, Manufacturing, Materials or similar engineering discipline
- Have graduated (or be in final term) with Honours Class 1 (or equivalent) and qualify for an RTP PhD stipend scholarship (~\$29k p.a. tax free)
- Be an Australian citizen or permanent resident. International candidates may be considered but may be deemed ineligible due to international restrictions with composite materials.

Financial support:

- Boeing will provide a \$50k top-up (over the life of the project) for two chosen candidates