# **Unraveling the Mechanical Behavior of Discontinuous Fiber** Composites Troy Nakagawa

### **Project Summary**

Discontinuous Fiber Composites (DFCs) made chopped fiber platelets offer unique of advantages over traditional unidirectional composites. The possibility of manufacturing DFC components by compression and injection molding thanks to the outstanding formability, makes DFCs a highly viable option even for very complex geometries. DFCs also show great promise in repurposing of thermoset prepreg waste. However, we need to further investigate the impact aging will have on repurposing of prepreg and how the random the mesostructure of DFCs effect its mechanical behavior.





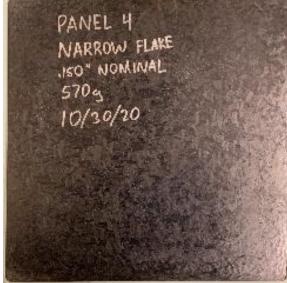
Platelet (Chip) based, discontinuous fiber form

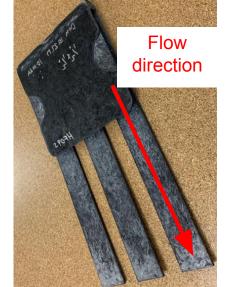


### Goals and objectives

The goal of this research is to characterize various the effects of aging, platelet size, and flow.

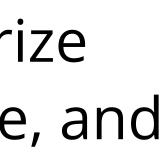


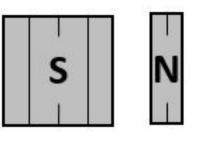


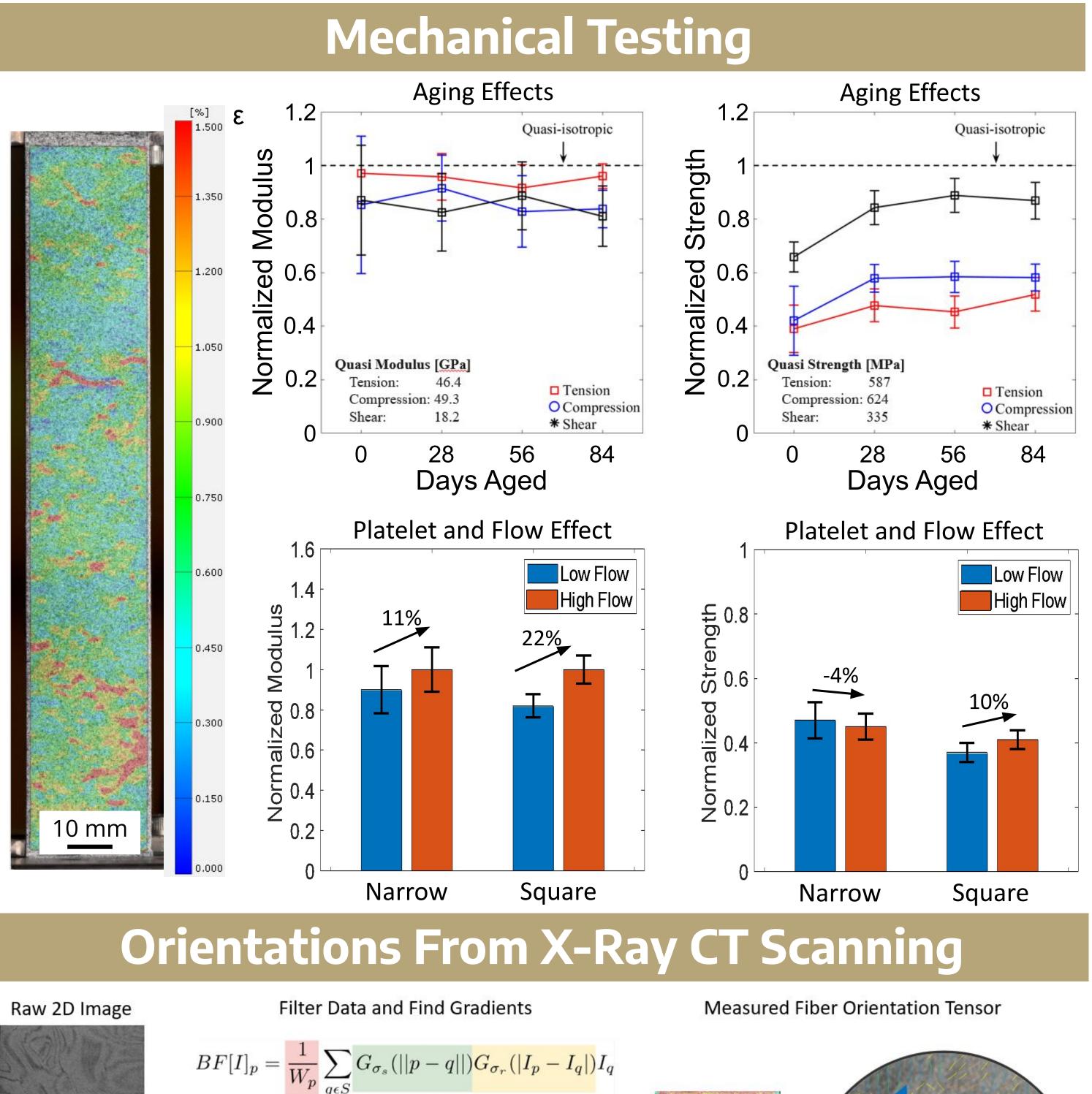


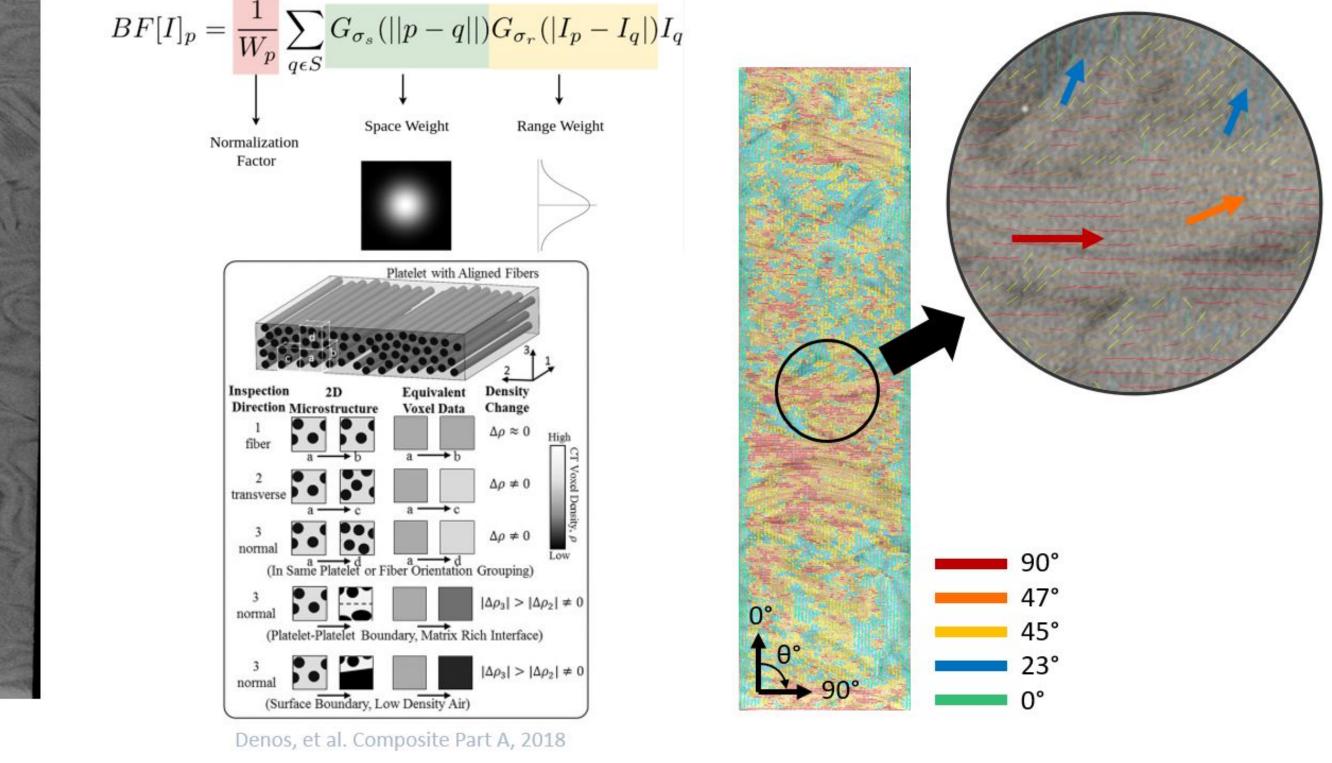
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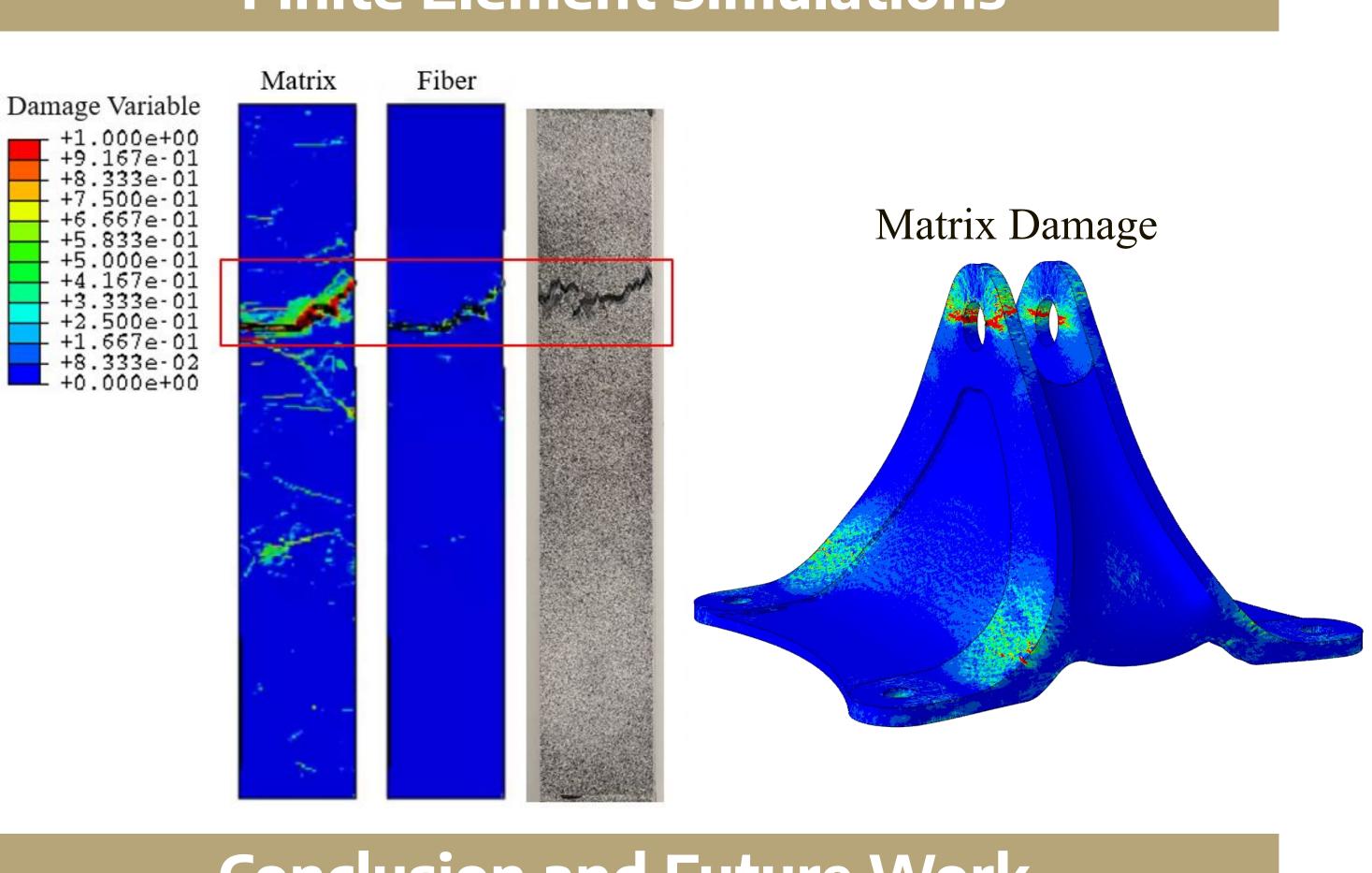




Gradients of the intensity of the image is found and eigen analysis is performed to obtain fiber orientations

**ADVISERS:** Dr. Marco Salviato SPONSORS: FAA, Boeing, Sekisui





- general increases tensile properties
- a real part





# **Finite Element Simulations**

#### **Conclusion and Future Work**

• Aging has no effects on the modulus of DFCs, but there is a strengthening effect Narrow platelets outperform square platelets Flow induces a biased orientation which in Work is being done on testing and simulation of

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