

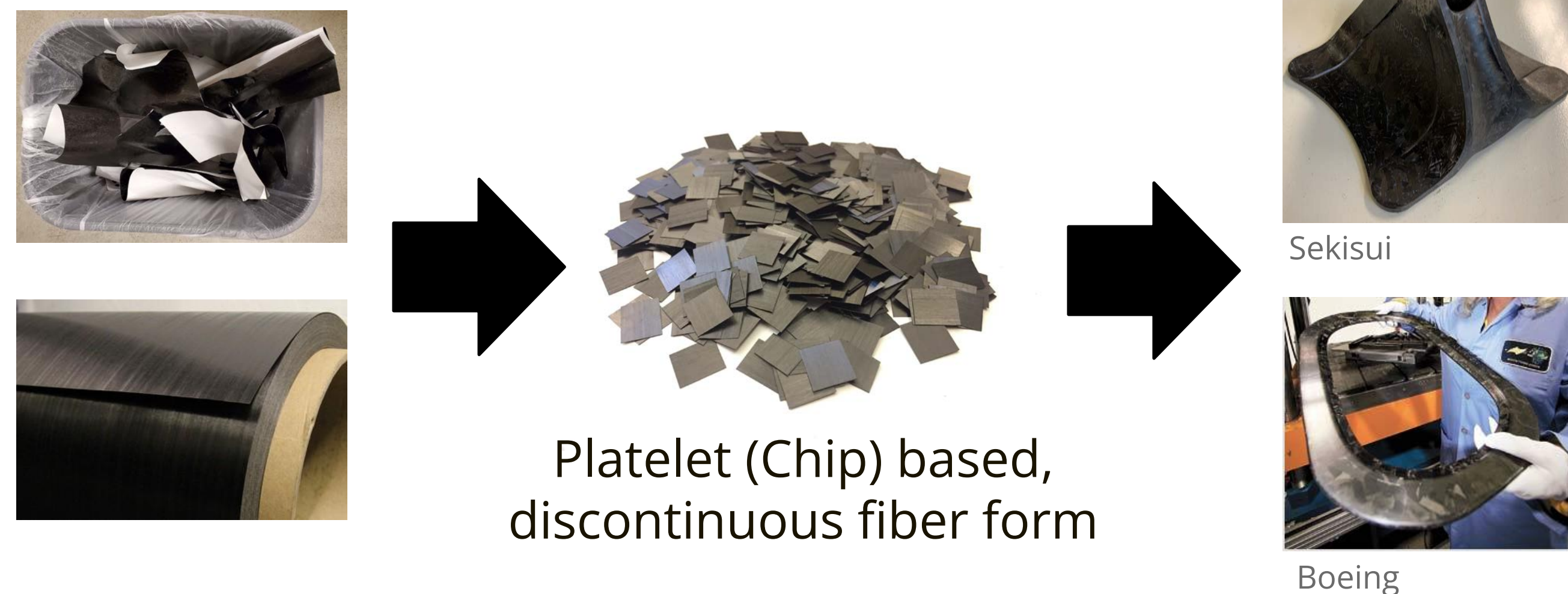
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Unraveling the Mechanical Behavior of Discontinuous Fiber Composites

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Project Summary

Discontinuous Fiber Composites (DFCs) made of chopped fiber platelets offer unique 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.

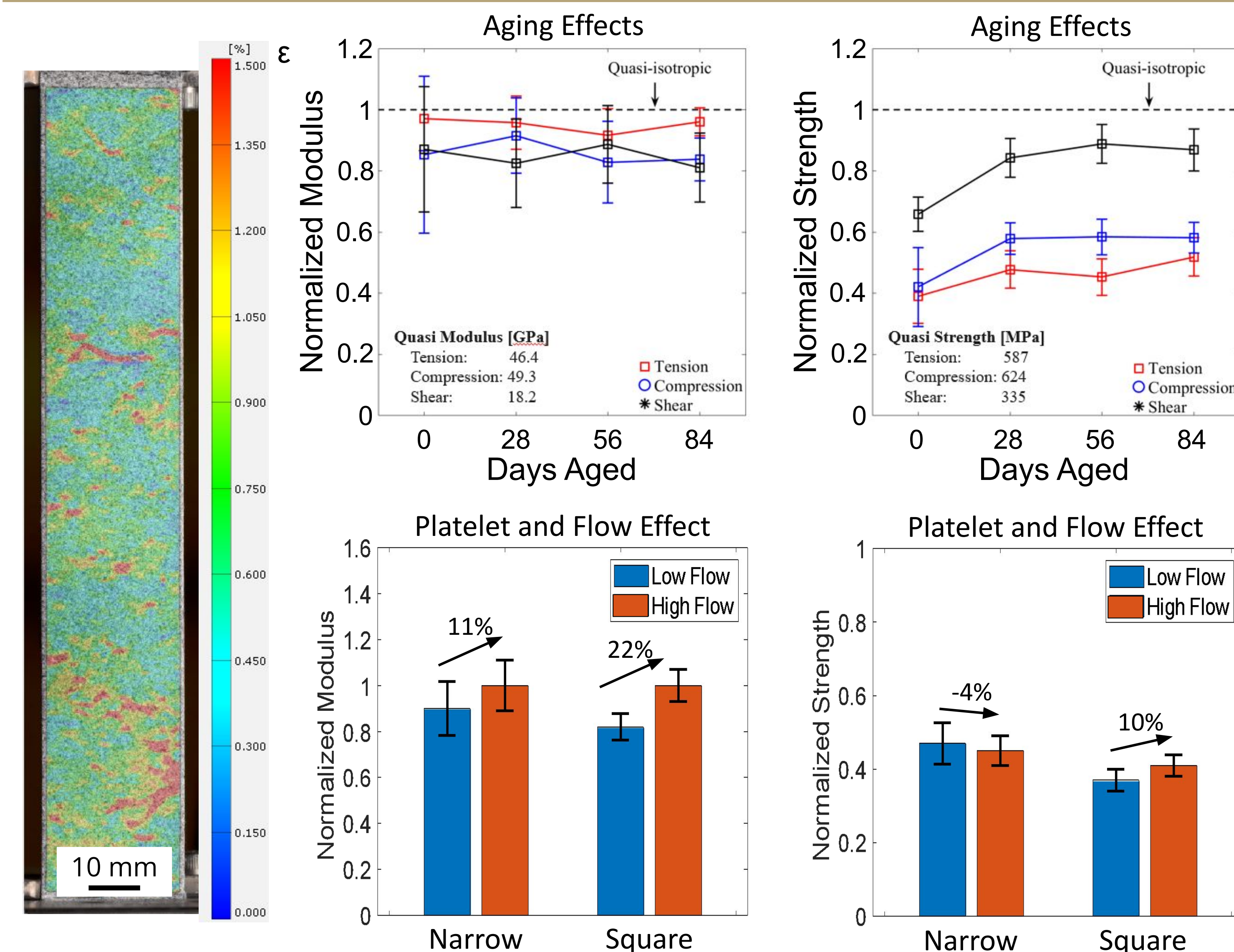


Goals and objectives

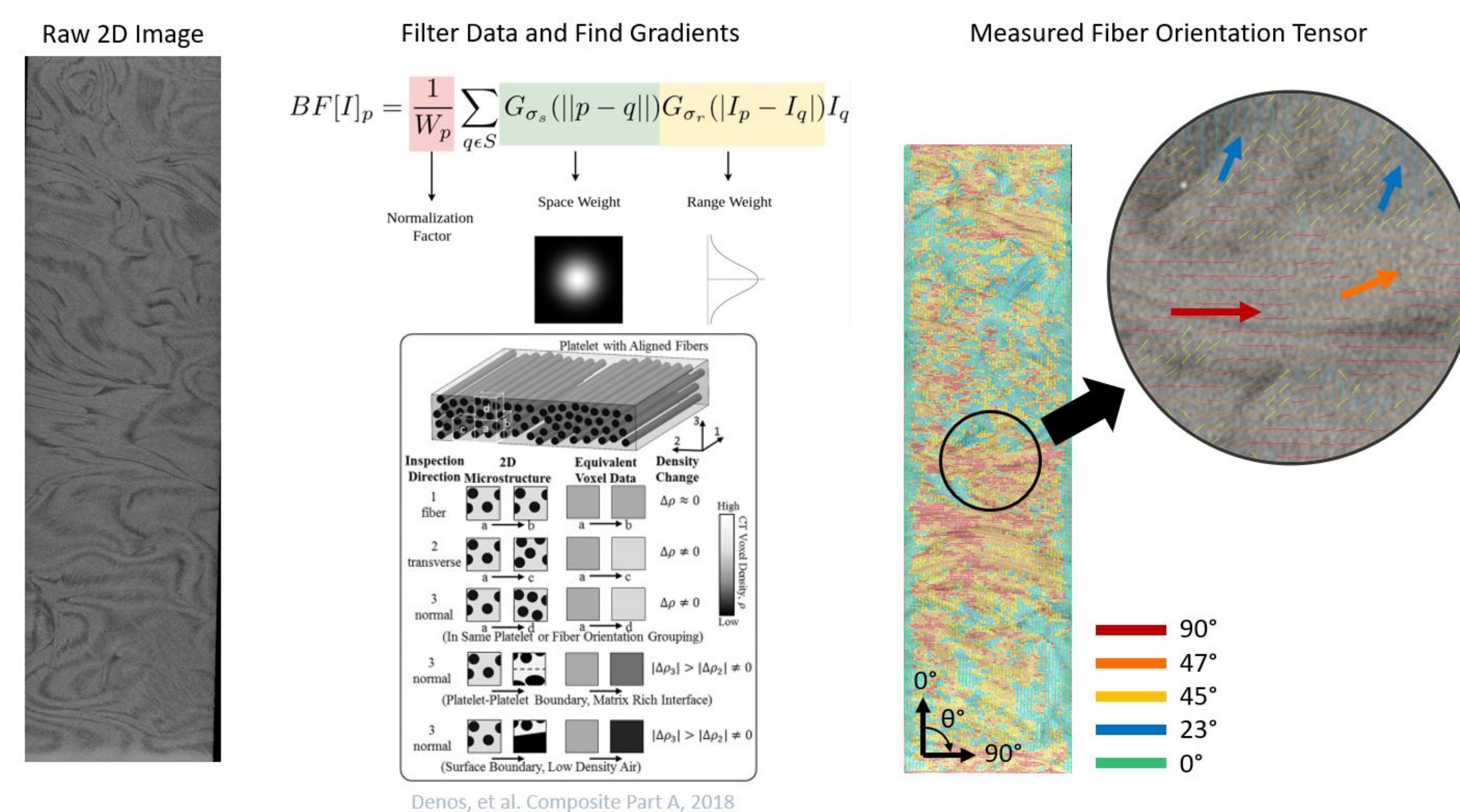
The goal of this research is to characterize various the effects of aging, platelet size, and flow.



Mechanical Testing

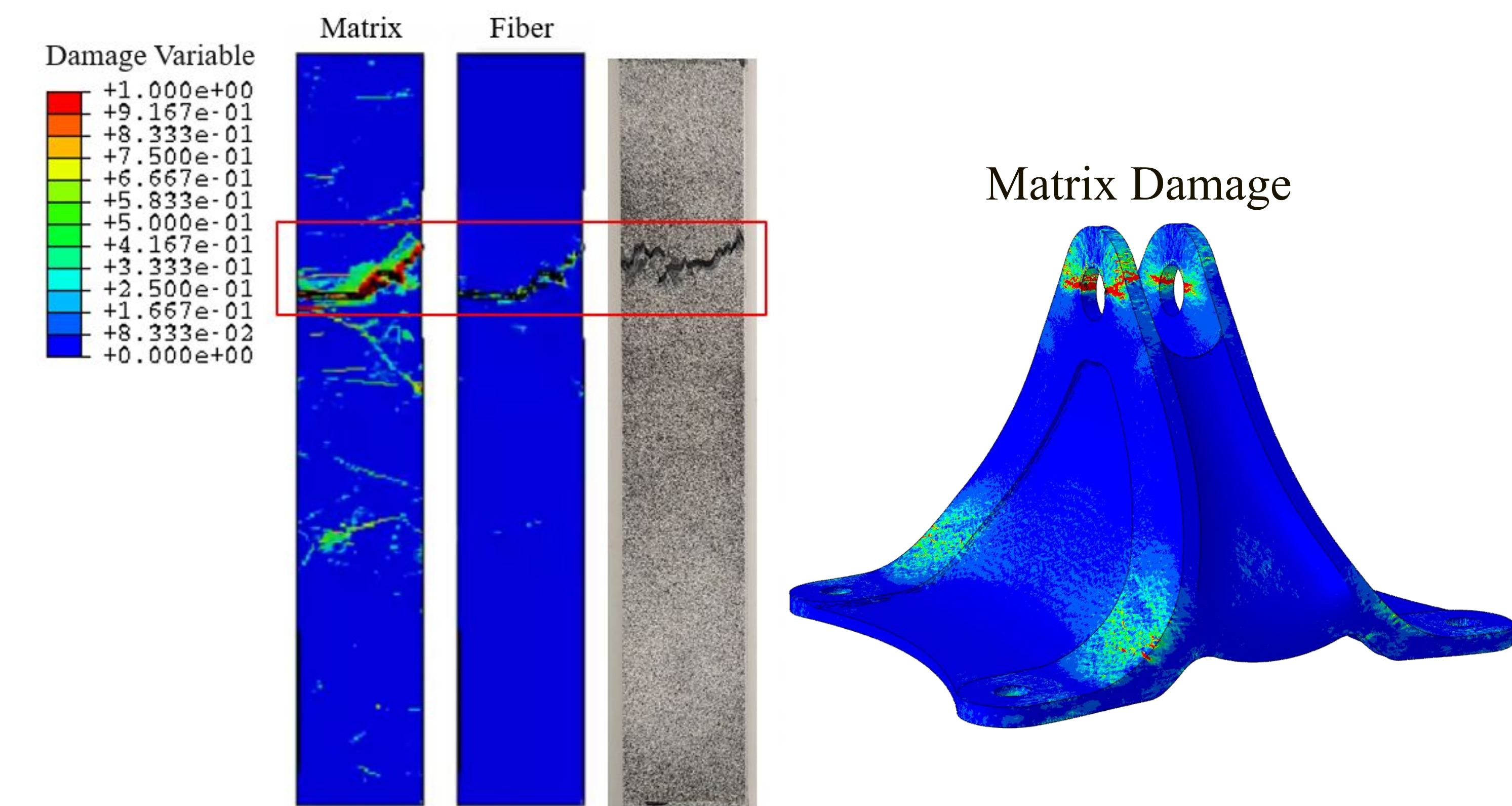


Orientations From X-Ray CT Scanning



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

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 general increases tensile properties
- Work is being done on testing and simulation of a real part

Acknowledgments

