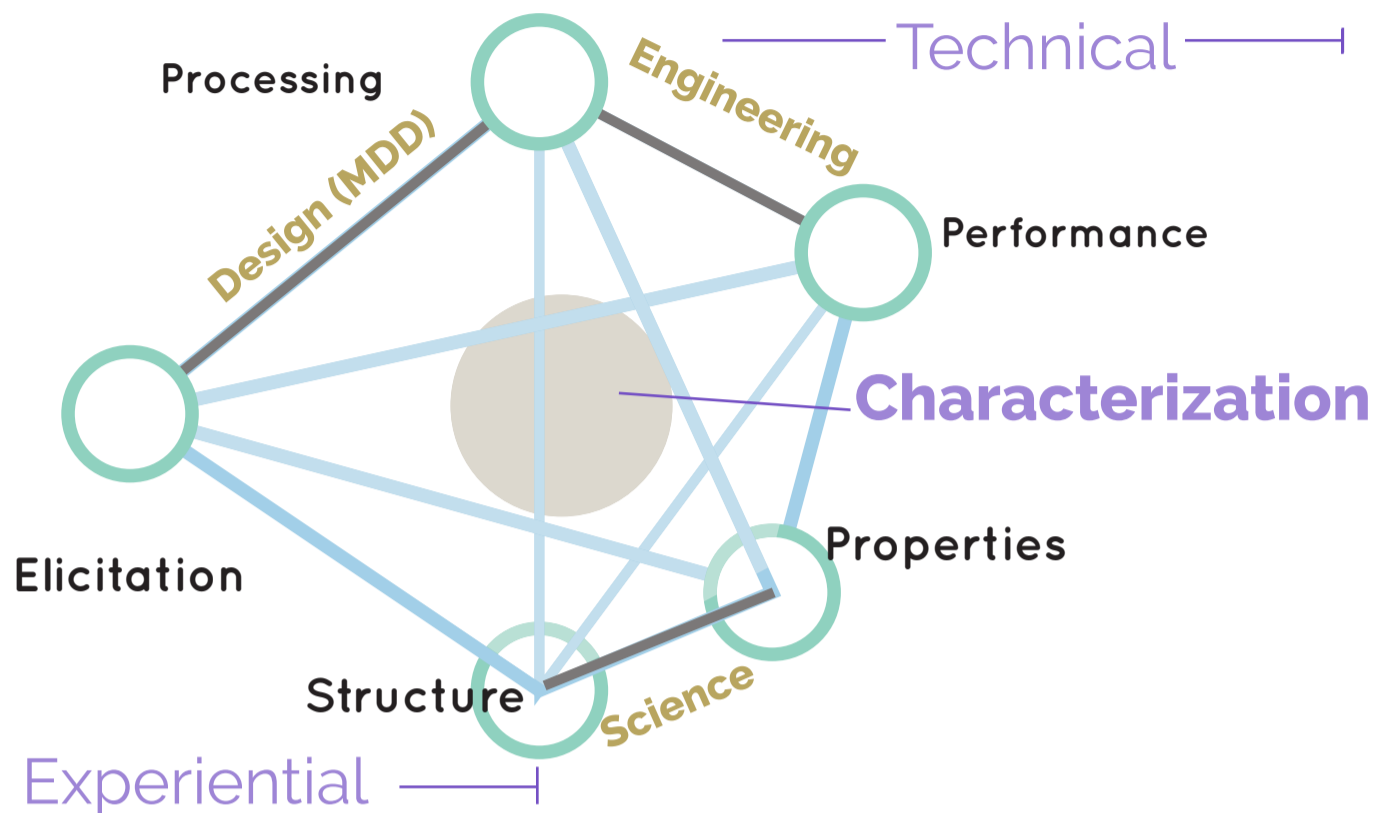


Characterizing Interwoven: Testing & Modeling Root-Textiles



Interwoven structures are made by **growing roots into patterns**. These show the potential to disrupt various commercial industries, especially as textile-based **natural fiber reinforcements for composite materials**. Following the Material Driven Design method (Karana, et al., 2015), two students have identified materials experience opportunities created by Interwoven materials, the mechanical properties and internal structure of Interwoven are still not fully understood.

This study tackles the challenge of performing a **technical characterization** on Interwoven structures in an effort to correlate processing parameters to its structure, properties, and performance. A series of tensile tests were performed on grids with a simple square pattern.

A full characterization of a material correlates the observed **properties** to the **structure** of the material, which is done through the use of **microscopy**. In addition to providing insight about the complex interactions of roots as they form the patterns that they grow into, the microscopy also revealed that there is a direct correlation between structure and strength.

The correlations between design parameters and material strength are summarized in the **Guidelines to Designing** with Interwoven booklet. A material demonstrator was also designed to showcase the locally variable mechanical properties in one structure while summarizing the test results in a way that is accessible and easy to understand.



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